SGE

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INTRODUCTION

Congratulations! You have just purchased one of the most technically advanced, state-of-the-art signal processors ever built!

The ART SGE allows you to combine 9 effects at once blending the best in digital signal processing with the best super hybrid analog circuits available today. The twenty bit multiple effects processor will provide you with a virtually endless range of singular effects, the best of all MULTIPLE digital effects, plus the most useful analog effects. Packed in a single high rack unit are numerous digital algorithms providing a full range of natural and simulated stereo reverberation effects. Also included are: digital delay, stereo chorusing and flanging, multitap delays, pitch transposition, panning, compression, expansion, noise gate, dynamic envelope filter, distortion, overdrive, turbo-drive, and a unique harmonic exciter. The ability to combine effects together enables you to design studio effects easily, or a new generation of sound effects all your own.

The SGE may be controlled and monitored directly from the front panel allowing you to permanently rack mount your unit. Certain functions and all parameters may be controlled via MIDI and real time Performance MIDI.

Special consideration was given to provide features that make the SGE much at home in the recording studio, P.A., guitar, and keyboard rig.

We strongly suggest that you read this manual and use it for reference while getting familiar with the SGE and its many capabilities. The initial factory presets were not only designed for instant use, but also as a starting point for your own innovative sound patterns. There is no substitute for hands on experience. Let your imagination run wild and enjoy.

ART is a strong proponent of user friendliness, this manual is written to support the concept of a user-friendly product along with a dedicated USERS manual. We feel that ease of reading along with hands on examples will help you familiarize yourself with your SGE. This will allow for maximum efficient use of a sophisticated digital signal processor.

INSTALLATION

The SGE may be used in a variety of setups including: mixing consoles with effect send and return facilities, directly in line between a musical instrument and amplifier, in the effects loop of an amplifier, and in the tape loop of a home receiver. Self contained in an all steel single high 19" rack mount case, the SGE is designed for continuous professional use. For touring rack applications, care should be taken to support the units rear if the rack might be subjected to mechanical shock. NOTE: The front panel may bend if no rear support is provided. Mounting location is not critical, but for greater reliability we recommend that you not place the unit on top of power amps, tube equipment, or other sources of heat.

You will notice there is no power switch on the SGE. This is because we have found that in the majority of applications a rack of units has its power supplied via a power strip that is controlled by a main power switch. No harm will come to the SGE if it is switched on and off in this manner.

CONNECTIONS

All audio connections to the SGE are made at the rear of the unit via professional 1/4" phone jacks. The MIDI connections are accomplished via five pin "DIN" jacks on the rear panel. Fig. 1 shows the rear panel connections.

The LEFT and RIGHT inputs are single ended with an impedance of 1.0M ohm. True stereo processing is accomplished by using both inputs in a left/right application. If only one input is used, the signal is automatically routed to both channels.

The LEFT and RIGHT outputs are single ended with a source impedance of 1.0K ohms, and can provide a stereo or mono output. When a stereo signal is applied to the inputs, the resulting output is stereo. If both outputs are used with a mono input signal, a stereo image is produced. Using one output with a mono or stereo source provides a mono signal combining the processed information from both outputs.

A variety of input/output combinations may be used with the SGE. One in one out (mono, either jack may be used), one in two out (stereo image), two in one out (summed mono output), and two in two out (stereo) may be achieved. NOTE: When using the SGE in the stereo mode, only the dry signal will remain totally left and right orientated at the outputs. The processed signal will be a mix of the inputs with its own individual stereo image dictated by the algorithm used.
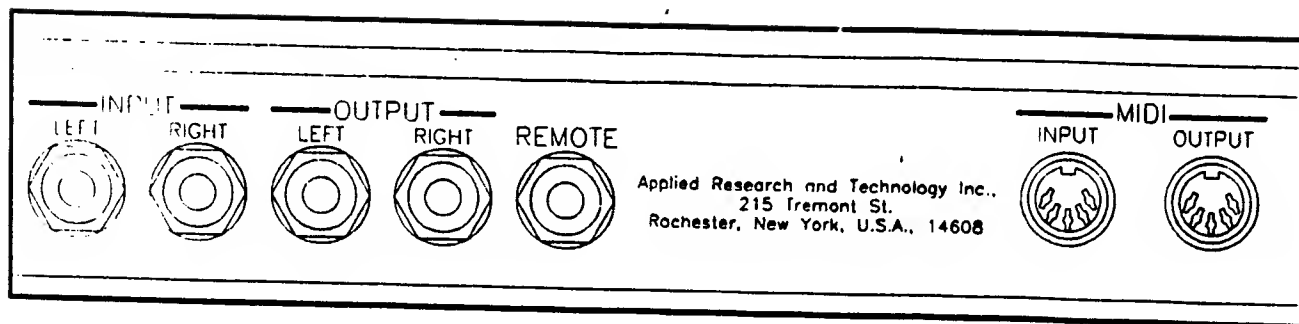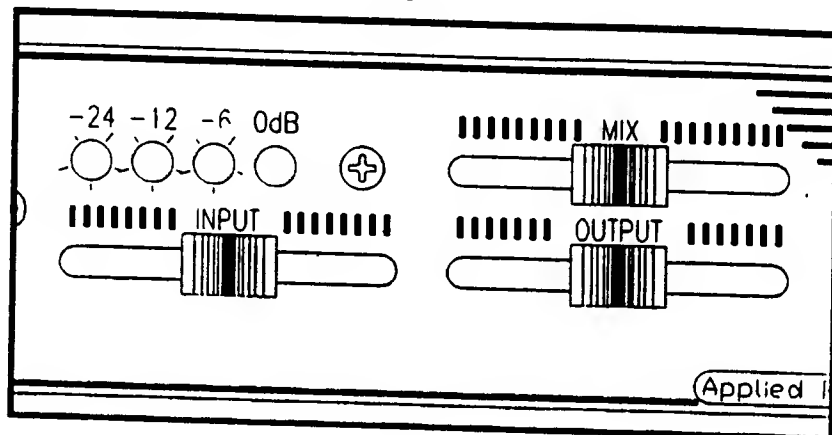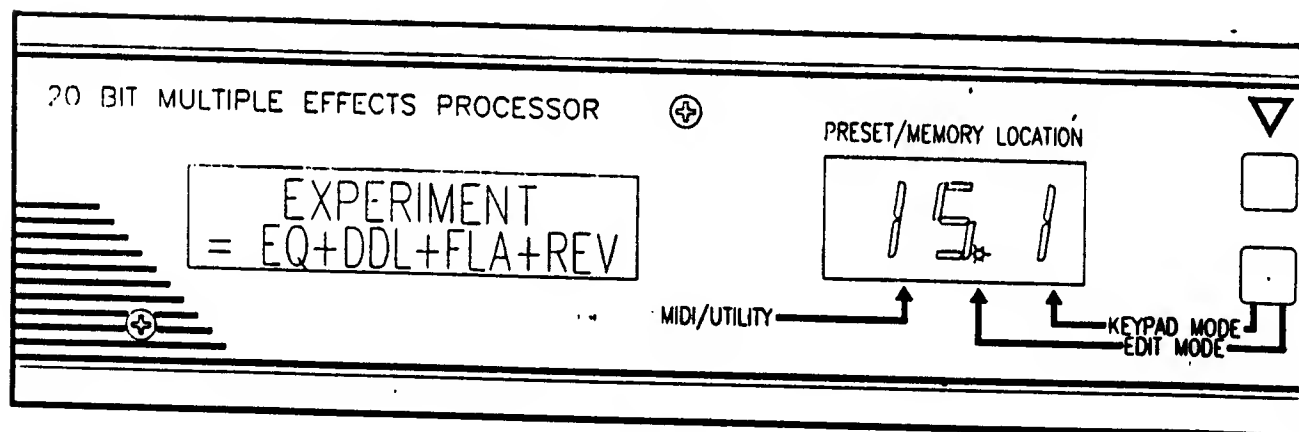
fig.1

fig.2

fig. 3

CONTROLS AND OPERATION

INPUT LEVEL CONTROL

The Input Level Control is located on the front panel below the
Input Level Indicators (see fig. 2). There are suggested input
level settings screened on the front panel for reference or quick
setup. This slide control adjusts the input signal to accommodate
a wide range of devices. Input levels may range from
approximately -20dbV to +16dbV. Source inputs may range from
musical instruments such as guitars and keyboards, mixing
consoles or effects loops in preamps and amplifiers. Whatever the
source, adjust the Input Level Control so that the Green LED's
(-24dB & -12dB) are lit constantly, the Yellow LED (-6dB) lights
with soft peaks and sharp peaks lighting the Red LED (0dB). If an
instrument such as a guitar is plugged directly into the SGE, set
the slider fully to the right. With line level devices (mixers,
some keyboards, effects loops) center the slider and control the
input level from the effects send. For a starting point set all
the sliders to the center position and if possible adjust the
output level of the device sending the signal to the SGE so that
-6dB is occasionally lit on soft peaks. Use the Input Level
control to compensate for minor level adjustments.

If the Input Level Control is not adjusted properly or the input
source has a low output level, noise and distortion will be heard
at the output of the SGE. See APPENDIX A for some level
suggestions.

INPUT LEVEL INDICATORS

Front panel LED indicators (fig. 2) show the input signal level
at all times. For maximum dynamic range the -24 and -12 LED
should be on most of the time with the 0dB LED briefly flashing
on transients only. This is a sufficient amount of input level to
operate the SGE and transients of up to 0dB will be handled
without incident. If you find that you are clipping the unit
simply reduce the input level to the SGE or decrease the slide
control slightly.

These indicators are reference levels only. Just because the 0dB
LED is lit doesn't mean that there is 0dBV present at the input.
For proper adjustment of level, review the Input Level Control
section.

CONTROLS AND OPERATION

MIX CONTROL

The MIX control (fig. 2) varies the amount of effect signal in
the output and may be programmed to pass either dry only or Post
Dynamic Effects (DYN EFX) only to Reverb, Modulation, and Delay
effects only. When the control is fully towards the left, only
the dry or Post Dynamic Effects signal (programmed) is apparent
at the output(s). As the slider is moved towards the right, more
digital processed signal is heard at the output(s). A
fifty/fifty mix is achieved when the slider is in the center
detent position. When the slider is fully towards the right, only
digital processed signal is heard at the output(s). For example,
in this position, (full wet) with the DRY/MIX ASSIGN set to POST
DYN EFX, you will hear the digital processed analog signal. See
page 10 for instructions on programming the MIX control.

OUTPUT LEVEL CONTROL

The Output Level Control (fig. 2) adjusts the final output level
of the SGE. With the slider fully to the left, there is no output
signal present at the output jacks (0%). As you move the slider
to the right the output signal level of the unit increases. When
the slider is fully to the right, 100% output is achieved.
WARNING!: You may acquire gain at the output, we do not recommend
that the SGE be used to make up for large losses of gain in a
system. There are some circumstances where this is unavoidable.
If this is the case, by all means compensate for loss.

The optimum setting is unity gain. With the Input Level Control
and the Output Level Control set at center, unity gain is
achieved. You may notice that these points are also the suggested
settings for line level devices. When you use the suggested level
settings for instrument level, the recommended output level is
approximately 30%. Your output level most probably will be
bumped a little up or down to compensate for small increases or
decreases in the processed signal level.

NOTE: Presets may have varying output levels. Output level may be
programmed in a preset by using an algorithm such as REVERB or
DELAY. Algorithms such as these have a LEVEL parameter which may
be set to vary the presets output level. We recommend that you
set the front panel sliders for optimum dynamic range and vary
the output level of the presets by programming the LEVEL
parameter.

CONTROLS AND OPERATION

SEVEN SEGMENT DISPLAY (Red Numeric Display)

The Seven Segment Display shown towards the right of fig. 3 (15.1), keeps you constantly informed of your Operation Mode, Preset Number or Memory Location. The decimal points indicate whether you are in Keypad Mode, Edit Mode or MIDI/Utility mode. The actual numbers refer to Preset Number or actual Memory Location. The only time a decimal point is not blinking is when the Keypad Mode is indicated.

LIQUID CRYSTAL DISPLAY (LCD)

All information relative to a preset indicated by the Seven Segment Display (left side of fig.3) is displayed by the LCD. Backlighting of the display is provided for ease of use in low light situations. The upper sixteen characters mainly display the Preset Title (name). If no title has been assigned, the display will read "<blank title>". In some cases other information will be displayed here. The lower sixteen characters display mainly the number and abbreviated description of effects stored, effects to be selected or deleted in the preset, and effect parameter information. Other information may appear here also. The view angle may be adjusted and is covered in the following section under MIDI/UTILITY function.

A stored of factory preset would be displayed in the LCD like the following representation.

```
   preset title ──────▶ ┌─────────────────────┐
# & description ──────▶ │ EXPERIMENT          │
of effects in          │ 3 DST+CHO+REV 2│◀──── # of MIDI controllers
preset                 └─────────────────────┘
```
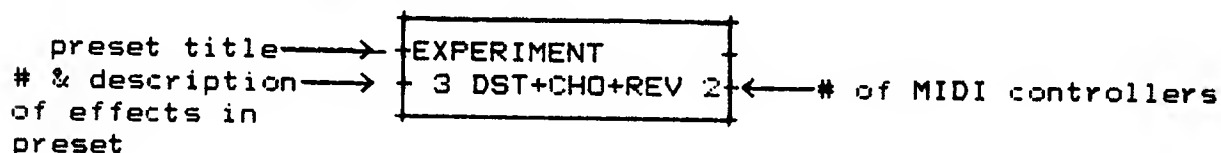
CONTROL BUTTONS

All of the control buttons with the exception of the PRESET
SELECT UP and DOWN and the BYPASS buttons serve a dual purpose.
The split functions are differentiated by color. Preset selection
is depicted by the color purple. Preset parameter control and
Utilities are labeled in grey. Two methods of Preset selection
are used, scanning (up/down with rapid access) and keypad number
entry. Refer to fig. 4 for reference to control buttons. Never
press all the buttons at the same time.
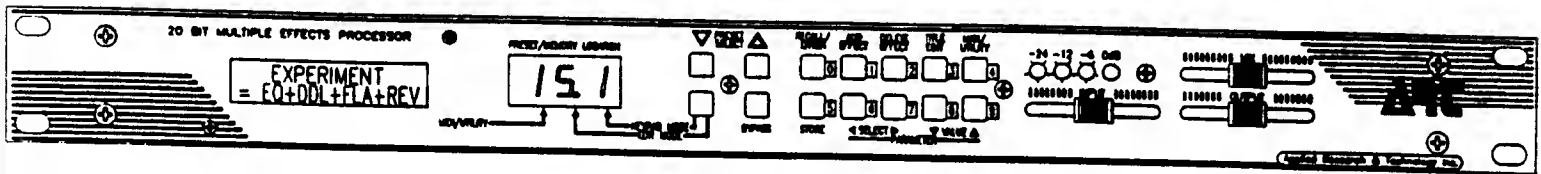
fig.4

PRESET SELECT

The UP and DOWN buttons shown as ascending and descending
triangles in purple and labeled PRESET SELECT on the front panel
are used to select PRESETs. Holding either button in will step
you through all 200 PRESETs when you're in Keypad Mode at a
moderate rate. You can step at a much quicker rate by using the
RAPID ACCESS mode. To access RAPID ACCESS mode, first press and
hold the button that is in the direction you want to go, then
simultaneously press the other button. As long as both are
pressed the display will increment by a value of ten rather than
one at a time. When you stop at the appropriate preset, it is
automatically recalled, signal is being processed constantly.

To preview presets before actually using them, press the grey
button labeled KEYPAD MODE/EDIT MODE so that the center decimal
point is lit (it will flash) indicating Edit Mode. I will explain
this button in detail later. Use the PRESET SELECT buttons to
scan through the presets. The processed output signal is not
affected, you are viewing only the preset titles. The reason for
this is so you can be ready for the next preset change when it is
supposed to happen. When you stop scanning, the preset number in
the Seven Segment Display will be flashing. To recall that preset
when you are ready just press the RECALL/ENTER button.

Press the KEYPAD MODE /EDIT MODE button so that the right decimal
point is lit indicating you are in the KEYPAD MODE. Scan through
the presets, you will instantly recall the preset when you stop.

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Keypad Entry

Make sure you are in the KEYPAD MODE. For instantaneous recall of the preset you must select the exact preset number. For example; you want preset 143, locate the buttons shown in fig. 4 labeled 0 through 9 on the front panel (the numbers are reversed image in purple), enter 1-4-3, instantly you will see the LCD read title and preset information. If you have audio hooked up you will notice that the preset has been instantly recalled. Let's try another number. Enter 34 (3-4). Oh no, what happened? What is that flashing digit and why didn't the preset change instantly? **YOU MUST ENTER A THREE DIGIT NUMBER** for instant recall. To instantly engage preset 34 you would have to enter the digits 0-3-4. Do this now and see that you get instantaneous results. Try preset 1. Did you do it right? (Enter 0-0-1) Now enter 1-5-1.

Let's discuss what happened when you entered preset 34 as 3-4. After the entry the digit flashed and then defaulted to the display of 034 and then recalled the preset. If you were to just enter one digit, the right digit would flash [_] and then the display would revert to the already existing preset.

KEYPAD MODE/ EDIT MODE BUTTON

THIS BUTTON IS PROBABLY THE MOST IMPORTANT BUTTON ON THE FRONT PANEL! If you are not in the right mode at the proper time, needless aggravation will be the result. The Operation Mode is indicated by which decimal point is lit in the Seven Segment Display. Always remember to check the Mode Status Indicator to assure yourself which mode you are in.

When you are in the Keypad Mode indicated by a constantly lit decimal point to the far right of the Seven Segment Display, you are able to access all of the two hundred presets either by scanning or by keypad entry as discussed in the previous sections under Preset Select and Keypad Entry.

BYPASS

Pressing the BYPASS button kills the effects signal in the mix passing only dry signal to the outputs and is shown two ways by the LCD. When you first press the BYPASS button in either operating mode with a preset listed in the LCD, the display will first read **** BYPASS **by with the "by" flashing for about two seconds. Then it will list the preset name along with the "by" flashing to indicate you are currently in the bypass mode.
NOTE: If the MIX control is set fully to the right, and BYPASS is initiated, no signal will be present at the outputs.
Pressing BYPASS again returns the unit to the ACTIVE mode indicated by the display ****ACTIVE**** for about two seconds and then just displaying the preset name and effects.

Another means of bypass is attained by programming the REMOTE jack on the rear panel for the bypass function described under the MIDI/UTILITY button and referred to as EXT SW MODE.

Refer to the REMOTE JACK section on page 20 for additional information.

Bypassing the unit via MIDI may be done by recalling a totally blank preset. Preset 100 is set up for MIDI BYPASS. Any null (empty) preset may be used. For convenience, just title a blank preset BYPASS.

MIDI/UTILITY

All the MIDI and System Utility functions are accessed when this button is pushed. **To enter MIDI/UTILITY Mode you must first be in EDIT Mode.** Press the EDIT Mode button and then press the MIDI/UTILITY button, the left decimal point in the Seven Segment Display will flash indicating that you are in the MIDI/UTILITY Operation Mode. To access individual parameters, use the SELECT< and SELECT> buttons. When you wish to change the variables use the UP and DOWN VALUE buttons. To exit the MIDI/UTILITY MODE you must press either the MIDI/UTILITY button or the EDIT button. Pressing the MIDI/UTILITY button will exit you to EDIT MODE. Pressing the EDIT Mode button will exit you directly to KEYPAD Mode.

Adjustable Parameters:

DRY/MIX ASSIGN
INPUT, POST DYN EFX
Assigns the path of the input signal to go directly to the dry side of the MIX control or through the analog section of the SGE first. For a graphic representation of this, see figure 5-1 on page 23.

Select INPUT if you are not going to use the analog effects. The output of the analog section is present at the dry side of the MIX control when POST DYN EFX (DYN EFX = dynamic effects) is displayed.

CONTROLS AND OPERATION

EXT SW MODE
EXTernal SWitch MODE: BYPASS ON/OFF or INCRement PROGramS
programs REMOTE jack for BYPASS or INCREMENT PRESET MODE
Refer to APPENDIX B for examples of programming the REMOTE jack
and further documentation.

MIDI ENABLE
PM= ON, OFF [ON]
PROG= ON, OFF [ON]
Allows you to turn on or off Performance MIDI and the Program
change function independently. If you wish to use PM and not
change presets via MIDI, set PROG to = OFF.

PRESET MEMORY ALLOCATION
MEMORY USED=
AVAILABLE=
Displays how much user memory has been used and how much user
memory is available for further storage.
See the MEMORY section in APPENDIX A for more information.
RECALL FACTORY PRESET
Allows you to recall any factory preset for comparison or editing
purposes. Refer to Appendix B for more details on how to use this
feature.

MIDI CHANNEL
OFF-16
Sets MIDI send and receive channel number.

OMNI MODE
ON, OFF
Sets MIDI OMNI mode on or off.

MIDI PROGRAM TABLE
Allows you to edit the Midi Program Table (MPT).
Refer to APPENDIX B for examples of editing the MPT and further
documentation.

MIDI MERGER
ON, OFF
Programs the MIDI out jack to "echo" MIDI information to the next
device.
When not using the merger, turn it off.

LCD VIEW ANGLE
Allows the viewing angle of the LCD Display to be adjusted.
Refer to APPENDIX B for an example of setting the view angle.

SOFTWARE VERSION LEVEL
Displays the software revision level currently installed in the
SGE.

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CONTROLS AND OPERATION

SEND PRESET
Dump a single preset via MIDI, hit UP or DOWN button.

SEND MPT
Dump entire MPT via MIDI, hit UP or DOWN button.

SEND ALL PRESETS
Dump all presets via MIDI, hit UP or DOWN button.

PRESET 1-100 LOCKED/UNLOCKED
Allows the first 100 presets to be overwritten or protected from overwrite. Use the VALUE buttons to select LOCKED or UNLOCKED status. You may UNLOCK only one Preset at a time. When the STORE button is pressed, the LOCK becomes enabled. At first you may not want to overwrite the factory presets, so increment up to a user preset and store the new preset. See APPENDIX B for examples of unlocking and copying a preset.

CONTROLS AND OPERATION

EDIT MODE CONTROL BUTTONS

Refer to fig. 5 for Edit Mode buttons
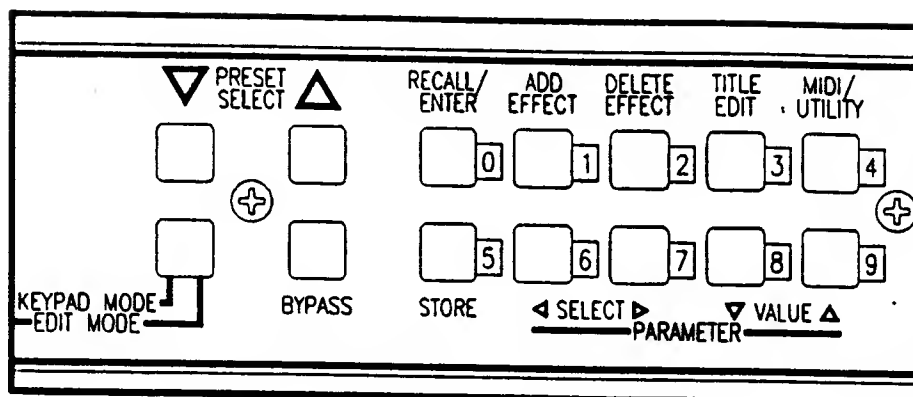
fig.5

RECALL/ENTER

The RECALL/ENTER button is used to Recall presets in the Edit
Mode and to Enter or Delete effects when using the ADD or DELETE
EFFECT button. To Recall a preset (the Seven Segment Display will
be flashing a Preset number), select the proper Preset and press
the RECALL/ENTER button. When prompted to Add or Delete an effect
press the RECALL/ENTER button to finalize the command.

ADD EFFECT

Press the ADD EFFECT button to select which effect you want to
insert into a preset. Let us first preview the effects you may
add. To do this we must first have a virgin preset. While in
Keypad Mode, enter 1-5-1, [blank title/no effects] is displayed
indicating a blank preset. A full description of these effects
is found later in this manual. **MAKE SURE YOU ARE IN THE EDIT MODE**
(Press the grey button). Press the ADD EFFECT button once, notice
that lower half of the LCD Display reads [ADD:HAR-EXCITER?].
Press the button again, [ADD:EQUALIZER?] is displayed. Continue
to press the button until the display reads <no effects>. This
will be twenty-five button pushes indicating that there are
twenty-four families to choose from!

When you wish to add an effect to the actual preset you must
press the RECALL/ENTER button to finalize the command. Doing this
inserts the effect temporarily in memory. If audio is passing
through the SGE, you will hear the effect when you press the
ENTER button.

To escape from ADD EFFECT, press either the VALUE UP or DOWN
button or press the KEYPAD/EDIT MODE button. This will return you
to square one.

It doesn't stop there! There are many sub variables of each
effect to be explored. Right now lets just worry about operation
and not the effects.
To simplify matters let's step through an example depicting the
selection of seven effects. We will use some of the buttons not
yet explained but doing it this way will make the understanding
of the programming much easier. The control buttons we use now
will be defined in detail later in the manual.

When you see text within the [ ] brackets, it is describing the
text as it appears in the LCD.

-Enter EDIT MODE.
-If you are not viewing preset 151, Use the PRESET SELECT buttons
 to scan up to preset 151.
-Press the RECALL/ENTER button [<blank title>, <no effects>].
-Press the ADD EFFECT button once, [ADD:HAR-EXCITER?].
*We are not going to choose this effect.
-Press the ADD EFFECT button again, [ADD:EQUALIZER?].
-Press RECALL/ENTER.
*You have just entered the equalizer into the chain, bottom
 display reads [EQu].
-Press ADD EFFECT three times, [ADD:DISTORTION?].
-Press RECALL/ENTER.
*Now a distortion algorithm is entered into the chain, [EQu+DST].
-Press ADD EFFECT twice, enter the COMPRESSOR into the chain.
*You pressed the ADD EFFECT button twice and then pressed the
 RECALL/ENTER button), display reads [EQu+CMP+DST].
-Press the ADD EFFECT button two more times, [ADD:EXPANDR-GAT?].
-Enter it into the chain (press RECALL/ENTER),[EQu+CMP+DST+EXP].
-Press ADD EFFECT three times [ADD:FLANGER?].
-Enter the Flanger into the effects chain [EQu+CMP+DST+/].
*Hey, what's that diagonal arrow? Why isn't [FLA] in the display?
-Press the VALUE UP button. [/+CMP+DST+EXP+/]
-Press the VALUE UP BUTTON again. [/+DST+EXP+FLA]
*Since the display cannot show all of the information, the
 diagonal arrows indicate more information to be viewed. Use the
 VALUE UP button to view right and the VALUE DOWN button to view
 left.
-Press the ADD EFFECT button three times and enter the MONO-DDL-S
 effect into the chain. [/DST+EXP+DDL+/]
-Press the ADD EFFECT button three more times and enter the
 REVERB-1 effect into the chain. [/+DST+EXP+DDL+/]
*We have just entered all the effects desired for this preset.

IF YOU WISH TO SAVE THIS CHAIN OF EFFECTS AS A PRESET YOU MUST
PRESS **STORE** NOW.

-Press STORE.
*The effects we have selected are now stored permanently in
 preset 151.
What happens if we continue to press the ADD EFFECT? You will
notice that we could still add two more effects plus MIDI
control. Press it and watch the LCD. It will read

CONTROLS AND OPERATION

[ADD:HAR-EXCITER?], [ADD:LOW-PASS?] and finally [ADD:MIDI CONTRL?]. Press the ADD EFFECT button once more (we will not add a controller) to continue. If you see this display and there are only three effects entered in for processing, it only means that you are using a considerable amount of processing circuitry to achieve a suitable sound output.

REMINDER: You have not set any parameters as of yet. Don't worry, we have preselected a nominal value for each of the parameters associated with an effect as a starting point. This provides a user reference to a sound instead of starting at point zero. We feel it is useful to hear a descriptive set of parameters so that you may tailor them to your own specific sound requirements. We'll look at these in just a moment as well as making a title for this preset. First, the DELETE key will be explained.

DELETE EFFECT

To delete one or more of the selected effects from your preset you will use the DELETE EFFECT button.

Recall preset 151, press the PRESET SELECT UP button once, press STORE. We have just copied preset 151 into preset 152 so as not to lose preset 151 which we will use periodically through this manual.

-Press the DELETE EFFECT once. [DEL:EQUALIZER?]
*Do you want to delete the equalizer? NO.
-Press the button again. [DEL:COMPRESSOR?]
*Let's delete this effect.
-Press RECALL/ENTER, [EQu+DST+EXP+/].
*The effect has been eliminated but not permanently. You will
 audibly hear the sound change when the effect is deleted. Press
 STORE to make this change permanent.
-Press STORE now.

With the elimination of an effect, you open up a space to insert another effect or leave things as they are. If you choose not to eliminate the effect and you wish to escape the Delete Mode, press either the Value UP or DOWN button.

If you press the DELETE EFFECT button and there are no effects in the preset, the display will read [DEL:NO FX TO DEL].

CONTROLS AND OPERATION

TITLE EDIT

One of the displays in the upper portion of the LCD is the title of the preset. To either edit the title or create a new one you must first enter the Title Edit Mode. Do this by pressing the TITLE EDIT button once. The display will read [Title Edit] in the upper portion and show a curser in the lower half. There is a total of sixteen spaces with the complete ASCII character set available to use in naming presets. We will name this preset EXPERIMENT. To do this perform the following steps.

-Make sure you are in EDIT Mode (Press EDIT button if not).
-Recall preset 151.
-Press the TITLE EDIT button. Locate and hold in the VALUE UP button. You will see characters displayed in an ascending order. (to increase the speed, press the opposite button after you depress the first, this works for both ascending and descending orders) You may find that depressing the button with single pushes works better at first.
-At the first cursor position, stop when "E" is displayed.
-Locate and press the SELECT > button once (this moves the cursor one space to the right).
-Use the VALUE buttons to display "X".
-Continue until you have spelled out [EXPERIMENT].
*I'm sure you had to go between all four buttons to get the right display, if not, congratulations.
-PRESS THE **STORE** BUTTON TO SAVE THIS.

Now that you have stored this title you must exit Title Edit mode. To do this press, the EDIT TITLE button, notice the display. The title is in the upper half of the LCD Display and the selected effects are in the lower half. If you wish to change the title just enter the Title Edit Mode and make the appropriate changes. Don't forget to STORE the new title.

If there are characters you wish to delete in the display use the SELECT< or SELECT> button to move the cursor and then **press the** ADD or DELETE EFFECT button. If you wish to delete all sixteen characters press the DELETE EFFECT or ADD EFFECT buttons sixteen times. By doing this you will eliminate any characters and **have a** blank display to start with.

To exit or escape from the Title Edit mode, press the TITLE EDIT button once to escape to EDIT Mode or press the EDIT MODE button to escape to keypad mode.

CONTROLS AND OPERATION

STORE

Any time you wish to permanently save information in a preset, press the STORE button. All parameter values will be stored into the chosen preset as well as TITLE information. When you press the STORE button the LCD will display [PRESET STORED]. If the phrase [LOCKED/SELECT LOCATION 101-200] appears don't panic. Presets 1 through 100 are the factory presets and though the parameters may be changed, the new values cannot be stored without first UNLOCKING the presets (see MIDI/UTILITY section).

There is another message that may be displayed when the STORE button is pressed. In the event that you have stored one hundred presets in the user memory then deleted and re-stored more information a number of times, the phrase [NO MORE MEMORY!] may appear. This probably will not occur, but if it does, don't worry. It does mean that there is no memory available for preset storage. If you use the Preset Memory Allocation utility, (pg.11) and it indicates there is memory available but you still can't store, it is because memory can become fragmented into separate "holes," none of which could be big enough to store the preset(s) you want. For example, if you were to store a preset 101 using 36 bytes, preset 102 using 31 bytes and preset 103 using 40 bytes AND then deleted preset 102, a "hole" in memory now exists, a 31 byte hole. The amount of memory available is the sum of all the holes. Usually the amount available represents a large hole. It is the combination of storing and deleting that can create holes. But not to worry: THERE IS MORE THAN ENOUGH MEMORY FOR THE AVERAGE USER. YOU WILL PROBABLY NEVER SEE THE MESSAGE, "NO MORE MEMORY!" IN RESPONSE TO A STORE OPERATION. If you do see this message, you may delete stored presets that you do not use often to gain more memory. If you are unable to release enough memory to store the desired preset, you should save your preset data (either by recording on paper the preset settings or by using a computer and a special piece of software called a Patch Editor/Librarian) and perform a factory reset.

TO DELETE A STORED PRESET, thereby releasing its memory to be used again, you must store a null preset at the preset number you wish to delete. A null preset consists of a blank title(all spaces, displayed as <blank title>) and no effects(displayed as <no effects>). Because of this, we recommend that you save one preset that is already blank to make it easy to delete stored presets. Presets 100 through 200 are null when you receive your unit or after a factory reset.

CONTROLS AND OPERATION

PARAMETER CONTROL BUTTONS

SELECT (< >)

The selection of available variables within a given parameter is accomplished using the SELECT<, and the SELECT> buttons. Treat these buttons like a cursor left and right on a computer. If the button is held in, the function will continue and cycle until it is released. We have already used these buttons to create a title, now we'll use them to view parameters and the selected variable. Once again recall preset 151. (Are you in the Edit Mode?)

Press the SELECT> once. [EQu:POSN=POST] This is an EQ variable. Press the button again. [EQu:100Hz = 0db] The Equalizer 100Hz filter band variable is displayed.
The next twenty-four times you press the SELECT> button, the display will show the selected parameter variables for all the effects stored in this preset. Scan through these using the SELECT< button to reverse direction.
Scan forward until [REV:TYPE=HALL-1] is displayed. Scanning further will display the parameter variable information. (next four presses). Press the button one more time. The preset effects are now displayed. The buttons cycle through the ends eliminating having to back up to the starting point.

VALUE DOWN & UP

These two buttons allow you to select or set the parameter variables for each preset. Like the SELECT buttons, they act like computer cursor keys. The function will not cycle through but stop at the end extremes.

When more than four effects are in a preset, you may view the additional effects by using these buttons. Diagonal arrows at either end of the LCD indicate there is more information to be viewed. Press the VALUE UP button to view right and the VALUE DOWN button to view left.

I know you're still in preset 151! Press the RECALL button. Press the SELECT > button nine times [DST:TURBO-DIST 2]. Now start pressing the VALUE DOWN button either by single pushes or just holding it down. Notice that there are a total of thirteen values just for the Distortion TYPE parameter. Select different parameters and use the VALUE buttons to view the different variables. If you changed any of the variables, the sound would be affected immediately. To save the change, merely press the STORE button. If you did not hit STORE, and used the SELECT buttons to get to the preset parameters, you will notice the LCD now has an extra character displayed on the left side. [≠ EQ+DDL+FLA+REV] This character [≠ (not equal)] indicates that the preset has different parameters than what is stored in the preset. If the character isn't there go back and change some values.

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CONTROLS AND OPERATION

MIDI

To access all MIDI parameters you must first be in the EDIT MODE.

Enabling the MIDI Functions
Press the MIDI/UTILITY button
Press the SELECT> button once to change PM or press it twice to change PROG.
Use the VALUE UP or DOWN buttons to set a value.
Exit MIDI Mode (press the MIDI/UTILITY button).

Setting The MIDI Channel

Press the MIDI/UTILITY button.
Press the SELECT > three times.
Use the VALUE UP/DOWN buttons to select the channel number.
Exit MIDI MODE (press the MIDI/UTILITY button)

Setting the OMNI Mode

Press the MIDI/UTILITY button.
Press the SELECT > button four times.
Use the VALUE UP/DOWN buttons to turn OMNI [ON or OFF]
Exit MIDI MODE (press the MIDI/UTILITY button)

MIDI Program Table

The MIDI Program Table allows the SGE to respond to a MIDI program change with any of its presets. The MPT is initialized for the first 128 presets to match the corresponding MIDI program number. (MIDI program numbers 0-127 will recall presets 1-128)

To edit the MPT:
Press the MIDI/UTILITY button.
Press the SELECT > five times.
Using the VALUE UP/DOWN buttons select the MIDI program number you wish to change the corresponding preset number for.
Press the SELECT > button again.
Now select the preset number you want recalled when that program number is accessed using the VALUE UP/DOWN buttons.
Continue editing if necessary.
Exit MIDI MODE. (press the MIDI/UTILITY button)

Note: full examples of editing the MPT may be found in Appendix B.

CONTROLS AND OPERATION

MIDI Merger

The MIDI Merger serves a useful function in the SGE. With this feature you are able to "echo" MIDI information to other MIDI devices in line with the SGE. This makes the MIDI OUT jack on the rear panel act the same as a MIDI THRU jack with a small delay of the MIDI information (less than 1 ms). The only difference is that if the SGE is commanded to send a message of its own, it will <u>Merge</u> the message with other messages that may occur without disturbing other messages.
Note: when you are not using the MIDI Merger turn it OFF
Press the MIDI/UTILITY button.
Press the SELECT > button seven times.
Use the VALUE UP/DOWN button to either turn the Merger ON or OFF.
Exit the MIDI MODE. (press the MIDI/UTILITY button)

Sending Preset and MPT Information

Transferring a single preset, all presets or the entire MPT to another SGE or a suitable MIDI device is accomplished by selecting the SEND A PRESET, SEND ENTIRE MPT or SEND ALL PRESETS function.

Press the MIDI/UTILITY button.
Use the SELECT buttons to select the appropriate command.
Follow the directions listed by the LCD Display.
Exit the MIDI MODE. press the MIDI/UTILITY button)

The SGE is shipped from the factory in OMNI mode, allowing it to receive MIDI PROGRAM numbers on any MIDI channel.

Receiving Preset and MPT Information

To dump MIDI data into the SGE from either another SGE or an external MIDI device you must make sure the MIDI channels match or OMNI mode is used. The SGE will accept MIDI data at all times regardless of what operating mode it is in.

REMOTE JACK

The REMOTE jack may be programmed to be used either to bypass the SGE or access the Increment Preset Mode. A footswitch is the intended device to be used with this jack. Either a momentary (normally open), or an on/off (you will have to engage the footswitch twice per event) switch may be used. It is recommended to use a momentary switch. If the jack is programmed for the bypass feature, each time the footswitch is activated (hot connected to ground) the BYPASS function is accessed. This jack may also be programmed to allow for incrementing through a set of presets. This feature is covered later in the manual. Examples 4 and 5 in APPENDIX B show how to program the REMOTE jack.

CONTROLS AND OPERATION

PERFORMANCE MIDI   [PM]

Performance Midi allows the SGE to have up to eight of its parameters per preset adjusted simultaneously via MIDI. Selection of the parameter to be controlled, the actual MIDI controller, the Scale of the adjustment ratio and the starting Center Point of the Scale may be programmed from the front panel.

We have added Performance MIDI to a selected number of factory presets which would benefit to the addition of real time MIDI control. A factory preset with a number in the lower right corner of the LCD (# of MIDI controllers) indicates PM is included.   In Appendix B, Examples, there is a complete example of setting up a preset with four parameters being controlled. There is also an example describing how to add PM to an existing preset. Refer to these examples to familiarize yourself with the programming of Performance MIDI. A table of MIDI controllers can be found in Appendix E, Tables and Charts.

When setting up a preset with PM, there will be three "screens" of programming information per controlled parameter displayed in the LCD.

When setting up a preset the first screen is used to select which parameter is to be controlled. In the top half of the display the message will read #(some number) IS CONTROLING, and in the bottom half, the effect and parameter to be controlled.

The second screen displays the information to define the MIDI controller to be used to control the effect parameter you just chose. (To make selection quicker, some of the more popular controllers are listed first.)

The third screen is used to select and adjust the Scaling of the controller and the Center Point of the parameter. The number displayed in the upper left corner represents the MIDI Controller you are working with. Scaling determines the range of control used to efficiently change the parameter. The Center Point represents the starting value of the parameter. When setting up a preset with MIDI control you may find it easier to set these values using the MIDI controller while listening to the sound and watching the ranges in the display.

The top half of the display shows the Scaling value. Scaling is set such that the greater the magnitude of the number, the greater the parameter will change in response. Negative numbers allow inverse relations between the changes in the parameter value.   See Appendix E for a quick reference chart for some suggested starting points for scaling of different parameters.

CONTROLS AND OPERATION

The bottom half displays the starting Center Point or the current value of the scaled parameter. Initially, when the preset is being set up or has just been recalled from memory the Center Point is displayed. This point could be described as the pivot point of change.

Confused? For a quick demo explanation it might be better to see what is going on. With a keyboard properly connected (MIDI) to the SGE locate and recall a preset with a **PM** designator. Pick one with a 2 displayed in the lower right of the LCD. Remember whenever you see a number in this location, it is indicating how many MIDI controllers are assigned to that preset.

- Press the Edit button.
- Press the Select> button until you have just scrolled through the preset "sound" parameters.
* You should now be viewing the first screen telling you the first controller ([#1 IS CONTROLING]) an effect parameter.
- Press the Select> button one time.
* You are now viewing the second screen indicating which MIDI controller is being used.
- Press the Select> button one time.
* You are now viewing the scale (range) the MIDI controller is operating over in the top half of the display. The bottom half displays the starting point of the parameter to be changed
- Use the MIDI controller
* Watch the values in both halves of the display change. As you access the controller, the scale value changes as does the parameter value.
- Press the SELECT> button three times.
* Take note of the MIDI controller.
- Press the Select> button once.
* You are viewing the second controllers scale and Center Point.
- Use the MIDI controller.
* Watch the values in both halves of the display change. As you access the controller, the scale value changes as does the parameter value.

Hopefully this brief example has shown you how the MIDI controllers vary the parameters they control. Please refer to Appendix B, **Setting up a preset with MIDI Control** for an in depth programming reference example.

DESCRIPTION OF ALGORITHMS & PARAMETERS

In all, there are twenty-four separate <u>categories</u> of algorithms
for you to choose from when selecting your effect or series of
effects. Each category may have from one to several
<u>characteristic</u> algorithms to choose from in the actual sound
shaping process. Nineteen of these are digital effects and the
remaining five are analog effects. The analog effects are located
at the beginning of the effects chain. See figure 5-1 for a
graphic representation of the signal chain.

There are some digital categories that cannot be combined
together. All five of the analog categories can be combined and
then added to a digital effects chain. Rather than tell you which
ones cannot be combined, the SGE automatically selects (or
defaults) to which algorithms may be combined and displays them
in the LCD when you are "ADDing an EFFECT". The default settings
for each parameter are shown in brackets [ ]. The SGE will also
automatically limit the extent of the algorithms control range.
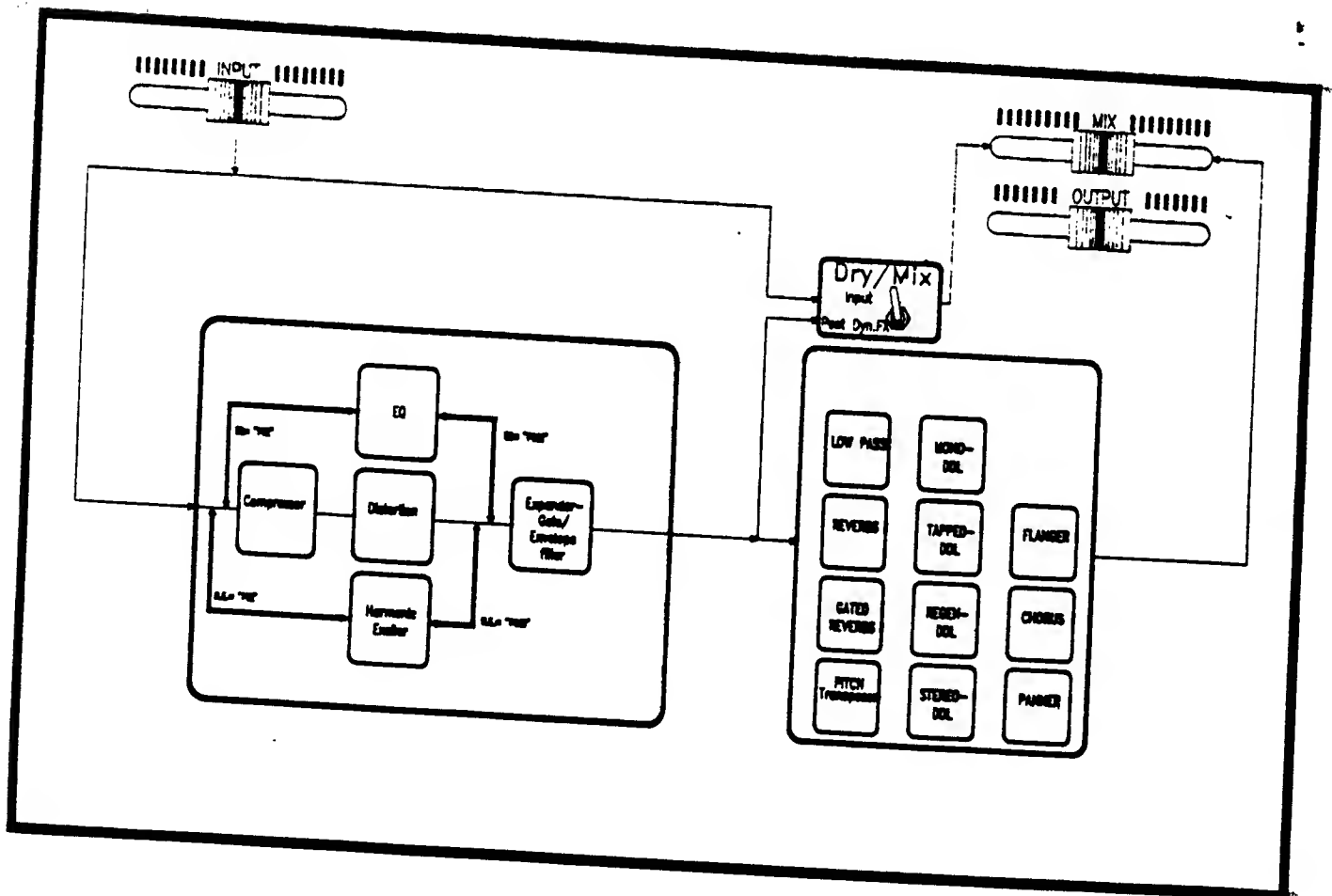
fig. 5-1

DESCRIPTION OF ALGORITHMS & PARAMETERS

HARMONIC EXCITER
[HAR-EXCITER], [EXC]

Parameters:
:POSN= POST, PRE [PRE]
:RANGE= OFF, 0 to 100% in % increments [86%]

The Harmonic Exciter should be used when you want to enhance or bring new life to an instrument and add clarity to vocals in a mix. The position in the signal chain may be put inn front of the Compressor or after the Distortion section. The RANGE parameter adjusts the threshold of the effect. More effect is perceived as the range approaches 100%.

EQUALIZER
[EQUALIZER], [EQu]

Parameters:
:POSN= POST, PRE [POST]
:100Hz= 0, +3, +6, +12, -3, -6, -12 db [0db]
:1KHz= 0, +3, +6, +12, -3, -6, -12 db [0db]
:10KHz= 0, +3, +6, +12, -3, -6, -12 db [0db]

Use this equalizer to boost or cut these three frequency bands. It acts much like BASS, MID or HIGH tone controls. Position in the chain may be first (if the Harmonic Exciter is not in the chain) or after the Compressor and Distortion.

COMPRESSOR
[COMPRESSOR], [CMP]

Parameters:
:SLOPE= OFF, 2:1, 4:1, LIMIT [4:1]
:DRIVE= 12 to 100% IN % increments [75%]
:RELEAS= SLOW, QUICK [QUICK]
:OUTPUT= 12 to 100% in % increments [75%]

Use the compressor as a level limiting effect to provide constant sound balance, punch or sustain. For a small amount of compression with vocals use a 2:1 slope. For good guitar sustain, use a 4:1 slope, a lot of drive with the release set at slow. Use the Limiter to really crunch your signal and protect your speakers.

This effect is a true RMS compressor with a fixed peak limiter. The SLOPE parameter selects the compression slope. DRIVE adjusts the maximum amount of gain covering a 30dB range in eight steps. RELEASE may be set to either FAST or SLOW. The release function is defined as the rate at which the gain increases as the input signal drops. NOTE: The Fast setting releases so quickly, the source loses most of its dynamics. To increase this effect even more, set the Slope higher. The OUTPUT of this effect is adjustable in 3dB steps over a 24dB range. Unity gain is achieved when the Output is set to 100% and the Slope is set to OFF. The

output level of the compressed signal is 0dB with the OUTPUT
parameter set to 75%. If the OUTPUT is set at 100%, the Limiter
will dominate the attack characteristics. The Peak Limiter
threshold is fixed at +3dB and is defeated only when the Slope is
set to OFF. If the signal exceeds the fixed threshold, the gain
is reduced almost instantly.

DISTORTION
[DISTORTION], [DST]

Parameters:
:TYPE= OFF, OVER DRIVE (1,2,3), DISTORTION (1,2,3),
 TURBO-ODRV (1,2,3), TURBO-DIST (1,2,3), [TURBO-DIST 2]
:DRIVE= 12 to 100% in % increments
:BITE= OFF, ON [ON]
:OUTPUT= 12 to 100% in % increments [87%]

Twelve different types of distortion are available! Use the
Overdrive type distortion when subtle distortion is required. For
clipping distortion use the Distortion type. The Turbo types are
bass frequency enhanced for fuller bottom sounds. Bite allows for
harmonics to figure more prominently in the character of the
distortion and to add a sharp edge to the sound. Modification of
the type of distortion can be done by adjusting the DRIVE
parameter and turning BITE on and off.

EXPANDER/GATE
[EXPANDR-GAT], [EXP]

Parameters:
:TYPE= OFF, EXPANDR, N-GATE, EXP+GAT, ENVFILT [EXP+GAT]
:SRCE= INPUT, POST-CP, OUTPUT [INPUT]
:RANGE= 12 to 100% in % increments [62%]
:TUNING= 12 to 100% in % increments [100%]
:OUTPUT= 12 to 100 % in % increments [100%]

The Expander section may be programmed as just an expander to be
used for subtle dynamic noise reduction. Program it for a
standard noise gate for noise reduction starting at a certain
threshold level. Using the combination of the two provides both
dynamic and predetermined noise reduction. The Expander may also
be programmed as a dynamic envelope filter which re-creates the
sound of the vintage waa-waa pedals.

The Expander has a slope of 1.5:1 and the Gate (an expander with
a higher slope) has a slope of 3:1. Above the threshold, both
types are unity gain. The Envelope Filter is a high Q sweepable
Low Pass Filter with a range of 30:1. The Tuning parameter sets
the sweep range covering a two octave range. At 100% the sweep
range is 110Hz to 3.5KHz. A sweep range of 28Hz to 875Hz is set
when the parameter is set at 12%. The RANGE parameter sets the
threshold for these effects in eight steps from 12 to 100%. The
highest threshold or least sensitive setting is 100%. The Gate
threshold is set 12dB below the Expander threshold.

DESCRIPTION OF ALGORITHMS & PARAMETERS

LOW PASS FILTER
[LOW-PASS],[LPF]

Parameter:
:HF-CUT=Selected frequency roll-offs from 665Hz to 15KHz [THRU]

There is one algorithm defining the Low Pass Filter. This effect
will always be placed at the front of the digital effects chain
so as to tailor the frequency response of the effect and not the
final product which should be further modified at the board.
Thirteen possible selections of roll-off frequencies are
provided.

FLANGER
[FLANGER], [FLA]

Parameters:
:TYPE= POST, PRE, OFF (two algorithms) [POST]
:WIDTH= 0 to 100 percent in % increments [76%]
:SPEED= 0 to 15 [4]
:REGENeration= 0 to 100 percent in % increments [67%]

A wide range of flanging effects may be created with the SGE. The
base delay of is set for the flanger and the sweep WIDTH and
SPEED is user controlled. REGENeration may be adjusted to vary
the "strength" of the processed signal. The output level of the
FLANGER algorithm is set for 100% and is not user adjustable.
When the Flanger TYPE= POST the flanger is positioned last in the
chain. This is to assure that maximum effect and presence is
maintained in all effects combinations. Using Flanger TYPE= PRE
positions the FLANGER in parallel with any Reverb or DDL effect.
By positioning the Flanger like this, the processed signal is not
delayed or reverberated and then flanged. Fig. 6 shows the signal
path.

CHORUS
[CHORUS], [CHO]

Parameters:
:TYPE= POST, PRE, OFF (two algorithms) [POST]
:WIDTH= 0 to 100 percent in % increments [35%]
:SPEED= 0 to 15 [8]
:DELAY= 0 to 66ms in 1 ms increments [30]

Chorus may be used to thicken or sweeten the final processed
sound. It is created by sweeping a comb filter through a base
delay time and generally using between a 30 to 60 percent mix
between the dry and wet signal. The base delay time plays an
important role in the "depth" perception of the effect. Longer
base delays are more preferable to give a deep rich sound to
vocals and guitars, while shorter base delays are used for more
delicate enhancement purposes. The width plays an important role

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in the range of perceived effect and is best used in conjunction
with the speed parameter. Like the FLANGER, the effect type may
either be POST or PRE located in relation to reverb or delay.
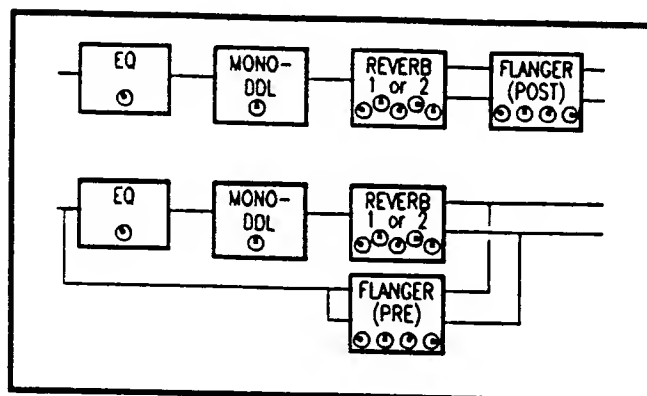
fig. 6

PITCH-TRANSPOSER
[PITCH-TRANS], [PTr]

Parameters:
:TYPE= SMOOTH, NORMAL, QUICK, OFF (three algorithms) [SMOOTH]
:PITCH = (-)12 to (+)12 half steps in 1 half step increments [0]
:FINE = (-)1.00 to (+)1.00 half steps in 0.06 half step
 increments [0.00]
:BASE KEY = OFF, 1 through 127 (key note on) [OFF]
:REGENeration = 0 to 100 percent in % increments [0%]
:LEVEL = 0 to 100 percent level in % increments [100%]

Pitch Transposing or pitch shifting can be used to develop
helpful second harmonies or other effects for vocals, instruments
and even mixed material. The range of pitch change is just over
two octaves. There are three "types" of pitch transposing to
choose from in the SGE, Smooth, Normal and Quick.
Smooth relates directly to processing and splicing the signal
more slowly, resulting in a cleaner more precise sound. Use the
Smooth setting when you are shifting pitch more than a fifth with
lower frequency inputs such as the low strings on a guitar.

Normal should be used for virtually all other applications of
pitch shifting. There is a little less delay than the Smooth
setting and qualitive processing is achieved.

When you select the Quick setting, a shorter delay time is used
causing faster splicing.   REGENeration is useful when you stack
the Pitch Transposer with the MONO DDL algorithm. Each time a
repeat is done it is shifted up or down by the pitch selected.

DESCRIPTION OF ALGORITHMS & PARAMETERS

Generally you should use the Normal Type for most applications. If you encounter problems relating to delay time, use the Quick Type and if detuning becomes a problem, use the Smooth Type. Fig. 7 shows the signal path of the Pitch Transposer.

The Base Key parameter should be used when triggering the Pitch Transposer from a MIDI keyboard. The amount of pitch shift may be set by MIDI Note On messages. The values selected in the Base Key parameter correspond to the MIDI Key Number. Example: BASE KEY = 60, (= middle C) if a D above middle C is played, the shift amount will be set to (2). If base key is set to OFF, Note On messages will not affect pitch.

Applications for the Pitch Transposer may be found in APPENDIX A.
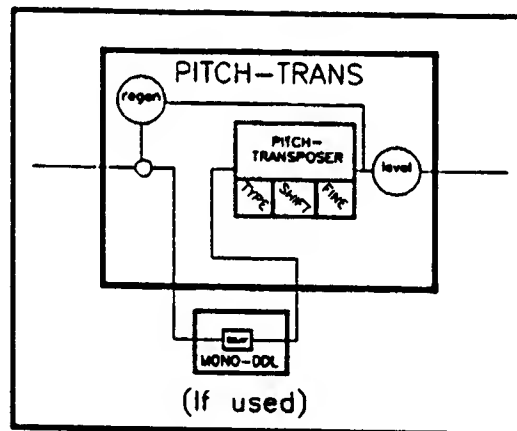
fig.7

DESCRIPTION OF ALGORITHMS & PARAMETERS

PANNER
[PANNER], [PAN]

Parameters:
:MOD % =0 to 100 percent in % increments [100%]
:SPEED = 0 to 15 [8]

Panning automatically pans the audio image from the left to the
right in the stereo sound field. By varying the MODulation, you
adjust the "depth" into the stereo field (how far left and right
you go). The SPEED merely controls the rate at which you do so.

MONO-DDL-S
[MONO-DDL-S], [DDL]
Mono Digital Delay - Short

Parameter:
:DELAY = 0 to 100 ms in 5 ms increments [50ms]

Use this DDL effect for Short delay times such as slap-backs or
with any other effect that requires only a small predelay as in
reverb effects. Placement is second in the effects chain.

MONO-DDL-L
[MONO-DDL-L], [DDL]
Mono Digital Delay - Long

Parameter:
:DELAY = 0 to 240 ms in 5 ms increments [125ms]

When Longer delay times than the MONO-DDL-S, are required, this
effect should be used. The effect will be placed second in the
chain of effects.

REVERB-1
[REVERB-1], [REV]

Parameters:
:TYPE= HALL-1, ROOM-1, PLATE-1, VOCAL-1, OFF (four algorithms)
 [HALL-1]
:DECAY = 0 to 25 seconds in varying increments [2.4s]
:HF-DAM= 0 to 50 percent in % increments [14%]
          definition: High Frequency Damping
:POSITN= FRONT to REAR in % increments [83%]
        definition: Position
:LEVEL = 0 to 100 percent in % increments [100%]

REVERB-1 algorithms are best used when you are using multiple
effects. They have less density and are more suited to effects
where the reverb is not the main effect but is used for presence.

DESCRIPTION OF ALGORITHMS & PARAMETERS

REVERB-2
[REVERB-2], [REV]

Parameters:
:TYPE= HALL-2, ROOM-2, PLATE-2, VOCAL-2, OFF (four algorithms)
        (REVERB-1 TYPEs are also available) [HALL-2]
:DECAY = 0 to 25 seconds in varying increments [2.4s]
:HF-DAM= 0 to 50 percent in % increments [14%]
        definition: High Frequency Damping
:POSITN= FRONT to REAR in % increments [83%]
        definition: Position
:LEVEL = 0 to 100 percent in % increments [100%]

REVERB-2 algorithms use more delay and have a higher complexity
than the REVERB-1 algorithms.

REVERB-3
[REVERB-3], [REV]

Parameters:
:TYPE= HALL-3, ROOM-3, PLATE-3, VOCAL-3, OFF
  (REVERB-1 and REVERB-2 TYPEs are also available) [HALL-3]
:DECAY = 0 to 25 seconds in varying increments [2.4s]
:HF-DAM= 0 to 50 percent in % increments [14%]
        definition: High Frequency Damping
:POSITN= FRONT to REAR in % increments [67%]
        definition: Position
:DIFFUS= 40 to 100 percent in four % increments [100%]
        definition: Diffusion
:LEVEL = 0 to 100 percent in % increments [100%]

REVERB-3 algorithms are the most complex and dense. Always use
REVERB-3 when building "reverb only" programs.

GATE-VERB-1
[GATE-VERB-1], [GAT]
Gated Reverb

Parameters:
:TYPE= SLOPE-1, FLAT-1, RVRS-1A, RVRS-1B, OFF (four algorithms)
        [SLOPE-1]
        definition: RVRS = reverse reverb
:DECAY = 0.05 to 0.25 ms in 5 ms increments [0.25s]
:DIFFUS= 60 to 100 percent in four increments of 20% [100%]
        definition: Diffusion
:LEVEL = 0 to 100 percent in % increments [100%]

DESCRIPTION OF ALGORITHMS & PARAMETERS

GATE-VERB-2
[GATE-VERB-2], [GAT]
Gated Reverb

Parameters:
:TYPE= SLOPE-2, FLAT-2, RVRS-2A, RVRS-2B, OFF (four algorithms)
        [SLOPE-2]
        definition: RVRS = reverse reverb
:DECAY = 0.05 to 0.40 ms in 5 ms increments [0.40s]
:DIFFUS= 60 to 100 percent in four increments of 20% [100%]
          definition: Diffusion
:LEVEL = 0 to 100 percent in % increments [100%]

GATE-VERB-3
[GATE-VERB-3], [GAT]
Gated Reverb

Parameters:
:TYPE= SLOPE-3, FLAT-3, RVRS-3A, RVRS-3B four algorithms)
        [SLOPE-3]
        definition: RVRS = reverse reverb
:DECAY = 0.05 to 0.40 ms in 5 ms increments [0.40
:DIFFUS= 60 to 100 percent in four increments of 20% [100%]
          definition: Diffusion
:LEVEL = 0 to 100 percent in % increments [100%]

Both GATE-VERB-1 and GATE-VERB-2 have forward and reverse gated
reverb algorithms which are not quite as dense or complex as
those found in the GATE-VERB-3 algorithms. For an equal decay,
GATE-VERB-1 is denser than GATE-VERB-2. The decay times found in
GATE-VERB-2 are longer. When used in a four effect stack of
effects these gated sounds will fill in nicely. If you choose to
use these effects alone, they will be loose and moderately
sparse. By varying the amount of diffusion you directly affect
the tightness (or looseness) of the sound. High diffusion equates
to a tighter effect.

GATE-VERB-3 algorithms are the most complex and dense. Always use
GATE-VERB-3 when building "reverb only" programs.

Fig. 8 shows the difference between normal reverb decays and
decays when a gated program is used. You will notice that the
normal decay gradually fades into nothing while the gated decays
in an abrupt manner. The most interesting gated program is the
flat setting. Here there is no decay but the equivalent of a
short burst of sound.
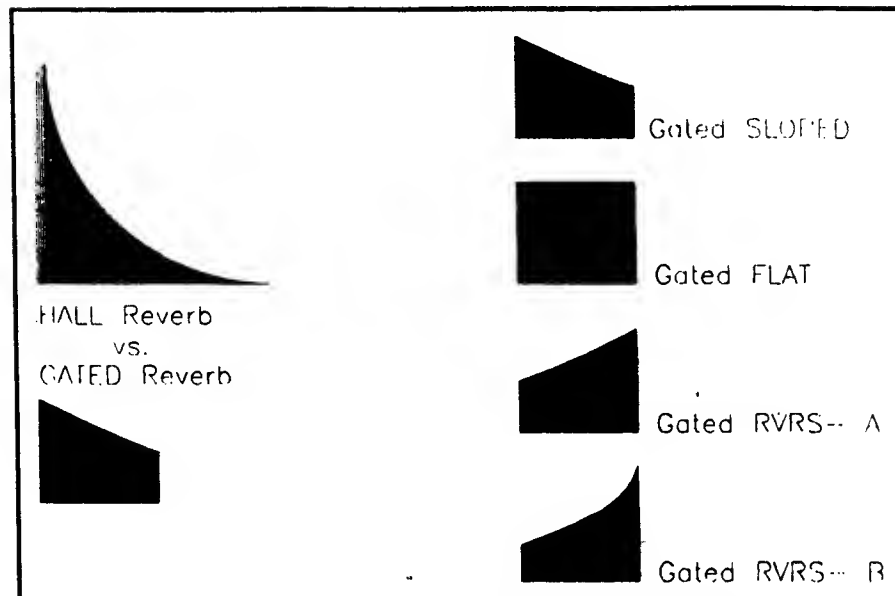
fig. 8
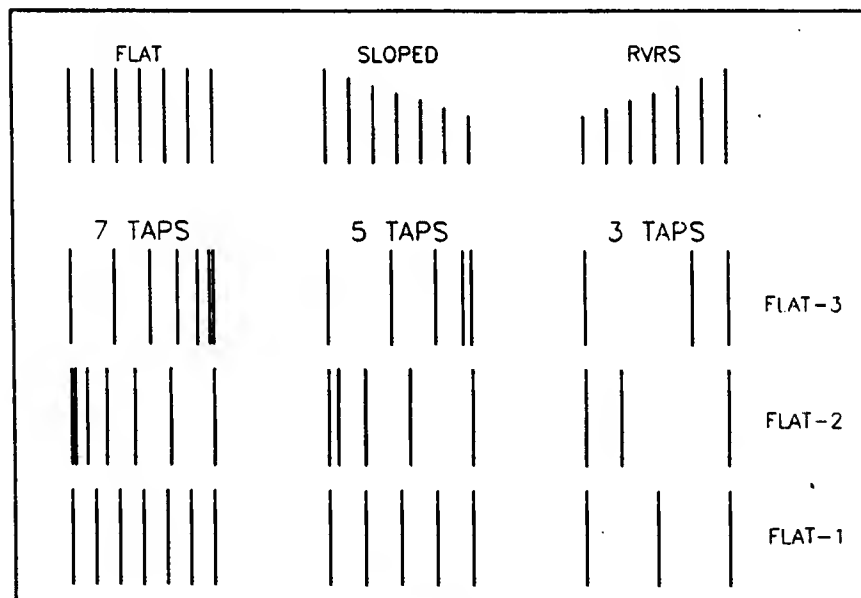
fig. 9

DESCRIPTION OF ALGORITHMS & PARAMETERS

TAP'D-DDL-S
[TAP'D-DDL-S], [DDL]
Tapped Digital Delay - Short

Parameters:
:TYPE:= FLAT-1m, FLAT-1s, RVRS-1m, RVRS-1s, SLOPE1m, SLOPE1s, (E)
        FLAT-2m, FLAT-2s, RVRS-2m, RVRS-2s, SLOPE2m, SLOPE2s, (S)
        FLAT-3m, FLAT-3s, RVRS-3m, RVRS-3s, SLOPE3m, SLOPE3s (L)
        (eighteen algorithms) [FLAT-1m]
:TAPS= 1 to 7 in one step increments [2]
:DELAY= 0 to 100 ms in 5 ms increments [100ms]
:LEVEL= 0 to 100 percent in % increments [100%]

TAP'D-DDL-L
[TAP'D-DDL-L], [DDL]
Tapped Digital Delay - Long

Parameters:
:TYPE:= FLAT-1m, FLAT-1s, RVRS-1m, RVRS-1s, SLOPE1m, SLOPE1s, (E)
        FLAT-2m, FLAT-2s, RVRS-2m, RVRS-2s, SLOPE2m, SLOPE2s, (S)
        FLAT-3m, FLAT-3s, RVRS-3m, RVRS-3s, SLOPE3m, SLOPE3s (L)
        (eighteen algorithms) [FLAT-1m]
:TAPS= 1 to 7 in one step increments [3]
:DELAY= 0 to 240 ms in 5 ms increments [240ms]
:LEVEL= 0 to 100 percent in % increments [100%]

There are three levels of tapped delays in the SGE. These are
what we call Even (E), Shortened (S), and Lengthened (L). See
fig. 9 for a graphic representation. (1's are Even, 2's are
Shortened, 3's are Lengthened) Even means that the delay taps are
at evenly spaced intervals. Shortened means that as the taps
approach the set delay, the intervals are closer together. As the
taps approach the set delay in the Lengthened mode they are
farther apart. In the types you will see an [m] and an [s], the
[m] means mono and the [s] signifies stereo. The mono tapped
delay has its left and right taps at the same delay points where
the stereo taps are staggered. When using the stereo tapped
delays the first right tap is half the delay time before the
first left tap. There also are three slopes used in the tapped
delays, Flat, Reverse and Forward.
Flat has a flat linear response. Reverse exponentially increases
in amplitude as the signal approaches the end. Forward
exponentially decreases in amplitude as the signal approaches its
end point. See figure 9. TYPE 3 taps are dense and full.
Use the longer tapped delay programs when you need to add some
expansiveness to short reverb patches. Use the longer tapped
delays especially the Sloped algorithms to create a fundamental
front end reverb.

DESCRIPTION OF ALGORITHMS & PARAMETERS

REGEN-DDL-S
[REGEN-DDL-S], [DDL]
Regenerated Digital Delay - Short

Parameters:
:DELAY= 0 to 100 ms in 5 ms increments [100ms]
:REGEN= 0 to 100 percent in % increments [57%]
:LEVEL= 0 to 100 percent in % increments [100%]

Since this delay algorithm has the characteristic of being in
parallel with a reverb program if used with one, it can be used
to add a small amount of depth, or wrap-around effect to the
sound. A "hard reverb" effect may be achieved by using longer
delay and a moderate amount of regeneration. Tonal sounding
drones may be found using short delay and large amounts of
regeneration.

REGEN-DDL-L
[REGEN-DDL-L], [DDL]
Regenerated Digital Delay - Long

Parameters:
:DELAY= 0 to 240 ms in 5 ms increments [200ms]
:REGEN= 0 to 100 percent in % increments [50%]
:LEVEL= 0 to 100 percent in % increments [100%]

Use this algorithm for the same reasons and applications as the
short Regen-DDL, only now the delay time is more than twice as
long allowing for more effect.

STREO-DDL-S
[STREO-DDL-S], [DDL]
Stereo Digital Delay - Short

Parameters:
:DLY-L= 0 to 360 ms in 5 ms increments [80ms]
          definition: Delay Time Left Channel
:DLY-R= 0 to 360 ms in 5 ms increments [110ms]
          definition: Delay Time Right Channel
:REGEN= 0 to 100 percent in % increments [57%]
:HF-DAM= 0 to 100 percent in % increments [0%]
          definition: High Frequency Damping
:LEVEL= 0 to 100 percent in % increments [100%]

DESCRIPTION OF ALGORITHMS & PARAMETERS

STREO-DDL-L
[STREO-DDL-L], [DDL]
Stereo Digital Delay - Long

Parameters:
:DLY-L= 0 to 500 ms in 5 ms increments [250ms]
        definition: Delay Time Left Channel
:DLY-R= 0 to 500 ms in 5 ms increments [125ms]
        definition: Delay Time Right Channel
:REGEN= 0 to 100 percent in % increments [50%]
:HF-DAM= 0 to 100 percent in % increments [0%]
        definition: High Frequency Damping
:LEVEL= 0 to 100 percent in % increments [100%]

You can split image or create alternating regenerative patterns
between the left and right outputs using Stereo Digital Delay.
The ability to set separate delay times for each channel enables
you to do this. When used in conjunction with the Flanger, Chorus
or Panner, spatial effects are the result. Regeneration is
derived from the left channel.

When longer delay times are needed, use the STREO-DDL-L
algorithm. Set both Left and Right Delay times at 500 ms for
maximum delay output with no separation. You may also operate
this effect in mono.

MISCELLANEOUS

Battery Backup

When power is terminated to the SGE, the edited MPT as well as the last preset used and the MIDI Channel will be active when the unit is next powered up. Memory retention is expected to last four years. Should you encounter memory loss, contact our service department. If you determine the battery needs to be replaced, refer to the Service Information section, Replacing the Lithium Battery.

Software Revision Level

There is a way to correctly identify the software version residing in the unit. Press the MIDI/UTILITY button, press the SELECT > button seven times. The current version as well as the date will be displayed in the LCD. The SGE's software is contained in a socketed EPROM and is field replaceable. This software controls the SGE's functions as well as its sounds.

User Registration Card

Be sure to fill out the USER REGISTRATION CARD at the back of this manual and send it in to our Customer Service Department. Doing this will insure that you are notified of any updates or other important information regarding your SGE. Please be sure to write in your serial number.

Factory Reset

There is a Factory Reset sequence which will reinitialize the SGE to ALL of its original values. Be sure that you have either downloaded or kept a written record of the Presets you want saved since they will be eliminated. To perform a Factory Reset you must press and hold the **PRESET DOWN, ADD EFFECT and MIDI/UTILITY** buttons simultaneously.

Preset Worksheet

A Preset Worksheet is located in the back of the manual. Use this sheet to record favorite presets for future reference. We suggest you make copies of this worksheet first.

Contact Information

Applied Research & Technology, Inc. (ART)
215 Tremont Street
Rochester, New York 14608
USA

(716) 436-2720
(716) 436-3942 (FAX)
Telex: 4949793 ARTROC

CIRCUIT DESCRIPTION

Although the SGE is predominantly digital, it must interface with analog audio signals. If you look at fig. 10, you will see that the audio signal passes directly down the chain of processing stages with all of the control provided by the control processor. The Input Processing stage buffers between the audio source and the SGE's internal circuitry. This stage also has the input filtering circuitry to remove unwanted very high frequency material. The signal is then sampled at discrete instants of time and converted into a continuous stream of digital numbers by the analog to digital (A to D) converter. After this conversion the numbers are then stored in memory.

At the heart of the SGE is the high speed 20 bit digital signal processor. This processor is capable of performing virtually millions of arithmetic calculations per second. The Digital Signal Processor retrieves the encoded numbers representing the input signal from memory and processes them according to the currently selected parameters. After that is done, the information is again stored in memory.

At regular intervals the processed data is recalled from memory and converted back into an audio signal by the digital to analog (D to A) converter. Alternate samples go to each of the two output sections and produce the left and right parts of a stereo image. Finally the output sections remove unwanted high frequency noise which may have been produced during processing and then is available at the outputs.

The Control Processor, along with its operating software (in EPROM), determines the "personality" of the SGE. It monitors the front panel controls, MIDI, Remote and inputs and outputs setting information to the user via the front panel displays. Button depressions are translated into commands understood by the Digital Signal Processor. Thus the user can make quick changes to the reverberant sound using concepts such as "Hall 1" without being concerned about the details.

The Control Processor also controls the storage of front panel settings in Preset Memory and their retrieval for later use or immediate comparison. A lithium battery preserves the presets when AC power is removed.

fig. 10

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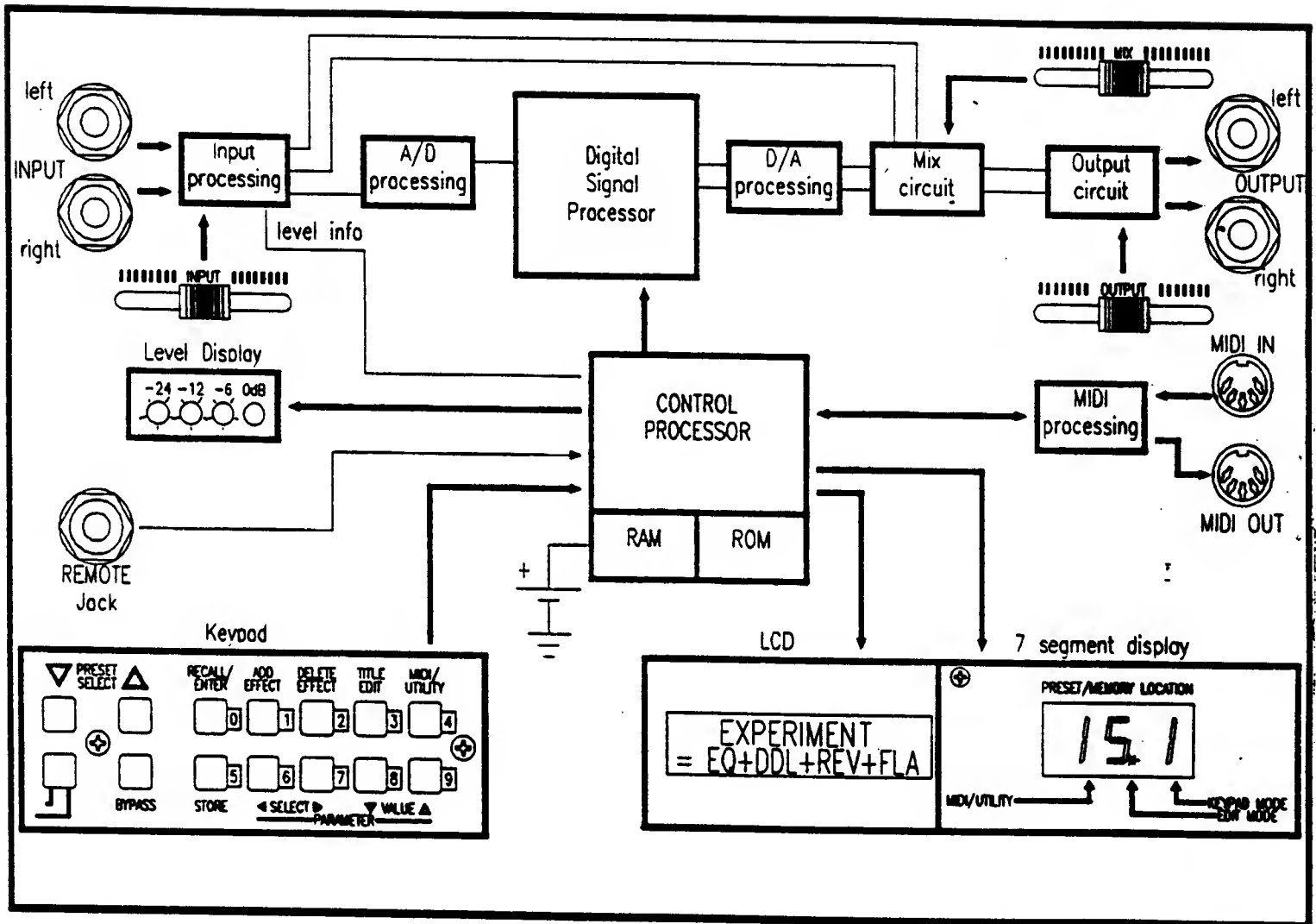
SPECIFICATIONS

```
Presets...................................................... 100
Memory Locations............................................. 200
Bandwidth.......................................35Hz up to 20KHz
Dynamic Range ...............................90dB Typical
(Digital Effects Path)
Equivalent Input Noise.............................-107dBv
(Input Control max, Compressor max Gain)
Operating Level...............................+16dBV max
Mechanical.................1.75"H X 19"W X 10"D, all steel case
Power Requirements.........105-125 Volts AC, 60Hz, Internal Fuse
                          195ma @ 115VAC, 22.4W
(Export unit configured for destination country.)
MIDI Receive Channel......................1-16, OMNI (all), Off
MIDI Programs.....................May be assigned to any Preset #
Connections...............Stereo In/Out 1/4" phone, MIDI IN/OUT
```

Harmonic Exciter:
```
Boost.......................................16dB at 16.5KHz
Attack.............................................. 1msec
Release............................................100msec
```

Equalizer:
```
Filter Bands  (3)......................100Hz, 1KHz, 10KHz
Boost/Cut.....................................(+/-)12dB
```

Compressor:
```
Gain..................................(-)10 to (+)30 dB
Attack Time (Compressor)..............................5msec
Attack Time (Limiter)................................(.1)msec
Release Time (Fast).................................75msec
Release Time (Slow)...............................300msec
Output Level................................0dB to (-)24dB
```

Distortion:
```
Gain..........................................(+)30dB
```

Expander/Gate:
```
Attack Time............................................2msec
Expander Attenuation...............................(-)30dB
Gate Attenuation...................................(-)60dB
Expander Threshold..........................(-)10 to (-)50dBv
Gate Threshold..............................(-)22 to (-)62dBv
Envelope Filter Threshold...................(+)3 to (-)37dBv
Envelope Filter Sweep Range.......................110Hz to 3.5KHz
Envelope Filter Tuning..........2 octaves, 1/2 octaves per step
```

ART retains a policy of constant product improvement.
Specifications are subject to change without notice.

Designed and manufactured in the United States of America.

SERVICE INFORMATION

Returning the Unit to the Factory for Service

The following information is provided for the unlikely event your unit requires service.

1) Be sure the unit is the cause of the problem. Check to make sure the unit has power supplied, all cables are connected correctly, cables themselves are in working condition and you are in the correct operating mode for what you are doing.

2) If you find the unit to be at fault, write down a description of the problem including how and when the problem occurs. Include this information with your unit.

3) Pack the unit in it's original carton or a reasonable substitute. The packing box is not recommended for a shipping carton. If possible put the packaged unit in another box for shipping. NOTE: The front panel is subject to damage in shipping if the unit is poorly packaged.

4) Include with your unit: a return shipping address (We cannot ship to a P.O. Box), a copy of your purchase receipt, a daytime phone number in case we need to contact you and the description of the problem.

5) Ship the unit to:
   APPLIED RESEARCH & TECHNOLOGY, INC.
   215 TREMONT STREET
   ROCHESTER, NY 14608
   ATTN: REPAIR DEPARTMENT

6) If you have questions regarding repairs, or if you think your unit may (or may not) need to be repaired feel free to contact our customer service department at (716) 436-2720.

CAUTION. The following servicing instructions are for use by qualified service personnel only. To avoid electric shock do not perform any servicing other than that contained in the Operating Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Replacing the Lithium Battery

CAUTION, battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Make sure power is removed from the device. Place the unit on a flat, stable surface, right side up, with the front facing you. Remove the four screws (two on each side of the case). Lift the cover up to remove. Locate the battery holder on the PC board. Lift the retaining finger and slide the battery out.

Replace the battery with Matsushita, Part No. BR2325 (or equiv.) by lifting the retaining finger and sliding the battery in place. Make sure the "+" mark on the battery is facing up. Slide the cover down on top of the unit, put the screws in about half way, slide the cover as far forward as possible and tighten the screws.

WARRANTY

Warranty service for this unit will be provided by Applied Research & Technology, Inc. in accordance with the following warranty statement.

Applied Research & Technology, Inc. warrants to the original purchaser that this product and the components thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

Applied Research & Technology, Inc. (ART) will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to the factory service department, accompanied by proof of purchase date in the form of a valid sales receipt.

EXCLUSIONS: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

ART shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

APPENDIX A

APPLICATIONS

LEVEL.

It is not suggested to use a microphone plugged directly into the SGE. Even though the device will function properly with some types of microphones you may encounter level mismatch or level problems. Some type of preamplifier is required since the input sensitivity of most microphones is less than -40dB.

Chorusing and Flanging are somewhat been susceptible to clipping due to their own characteristics. It may be necessary to use a slightly lower input level when using these effects.

When using Distortion, you may increase saturation by running the input slider wide open.

NOTE: Presets may have varying output levels. Output level may be programmed in a preset by using an algorithm such as REVERB or DELAY. Algorithms such as these have a LEVEL parameter which may be set to vary the presets output level. We recommend that you set the front panel sliders for optimum dynamic range and vary the output level of the presets by programming the LEVEL parameter.

For the effects that have the LEVEL control parameter, use this control to adjust for depth, apparent mix level, volume adjustment for each preset as well as normal output level. By adjusting level in this manner, you need not constantly adjust the Output Level Control.

PITCH TRANSPOSER

The Pitch Transposer's most obvious area of use is in producing real-time vocal and instrument harmonies. Some knowledge of music theory is necessary to use the Pitch Transposer. It is helpful to have a basic understanding of musical intervals and scales.

Each musical note has a specific physical or sound attribute called its frequency or pitch. The range of pitches used to create music is divided into intervals between pitches. The basic interval is the octave. The two pitches which span an interval of an octave have a frequency ratio of 2:1. The higher pitch is exactly twice the frequency of the lower pitch. The octave is divided into twelve intervals called half steps. One half step is the interval between adjacent frets on a guitar or between successive keys, including the black keys on a piano. Other intervals smaller than an octave may be formed by combining half steps. These intervals are listed on the following page.

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Number of Half Steps / Interval
     1 / Half Step, Semitone, Minor Second
     2 / Whole Step, Whole Tone, Major Second
     3 / Minor Third
     4 / Major Third
     5 / Perfect Fourth
     6 / Augmented Forth, Tritone, Diminished Fifth
     7 / Perfect Fifth
     8 / Augmented Fifth, Minor Sixth
     9 / Major Sixth
    10 / Minor Seventh, Dominant Seventh
    11 / Major Seventh
    12 / Octave

A musical scale is a consecutive series of notes within an octave. Each scale is compromised of a specific sequence of whole and half steps from the tonic or key note. A scale containing all twelve half steps is termed the chromatic scale. The most common scale ,and the basis for other scales is the major scale. (Do-Re-Me-etc.). The major scale adheres to the following pattern:
I -- II -- III -- IV -- V -- VI -- VII -- VIII
whole-whole---half-whole-whole-whole--half

This scale and all others spans an octave. Other scales follow different series of whole and half steps that add up to an octave.

Unfortunately, a basic melodic harmony to the major scale is comprised of a series of notes which are an interval of a minor or major third above the original scale. The specific sequence for harmonies above a major scale is shown in the chart found in APPENDIX E. Relative minor scale sequences are shown in a separate table in the same appendix. Note that, while the interval of an octave is not normally thought of as a harmony , it is the easiest to perform, since the harmony scale is always twelve half steps above or below the major or relative minor scale (preset 21). The interval of a fifth (seven half steps, preset 19) is also quite useful, since, in general long passages may be played without changing intervals.

To use the Pitch Transpose to play a correct harmony other than an octave to a melody line, it is necessary to set up two or more presets for different intervals and alternate between them.

MEMORY

You now have a Utility that informs you how much User Preset Memory has been used or how much memory there is available for storing presets. When you first access user memory there are approximately 6000 bytes (6 Kbytes) of space available. Each time you store a preset more space is used up. As a rule of thumb, a preset uses approximately 30 bytes. Sometimes the display will inform you that there is space available, but you are not allowed to store any more information.

NO MORE MEMORY!

There is a message that may be displayed when the STORE button is pressed. In the event that you have stored one hundred presets in the user memory then deleted and re-stored more information a number of times, the phrase [NO MORE MEMORY!] may appear. This probably will not occur, but if it does, don't worry. It does mean that there is no memory available for preset storage. If you use the Preset Memory Allocation utility, (pg.11) and it indicates there is memory available but you still can't store, it is because memory can become fragmented into separate "holes," none of which could be big enough to store the preset(s) you want. For example, if you were to store a preset 101 using 36 bytes, preset 102 using 31 bytes and preset 103 using 40 bytes AND then deleted preset 102, a "hole" in memory now exists, a 31 byte hole. The amount of memory available is the sum of all the holes. Usually the amount available represents a large hole. It is the combination of storing and deleting that can create holes. But not to worry: THERE IS MORE THAN ENOUGH MEMORY FOR THE AVERAGE USER. YOU WILL PROBABLY NEVER SEE THE MESSAGE, "NO MORE MEMORY!" IN RESPONSE TO A STORE OPERATION. If you do see this message, you may delete stored presets that you do not use often to gain more memory. If you are unable to release enough memory to store the desired preset, you should save your preset data (either by recording on paper the preset settings or by using a computer and a special piece of software called a Patch Editor/Librarian) and perform a factory reset.

TO DELETE A STORED PRESET, thereby releasing its memory to be used again, you must store a null preset at the preset number you wish to delete. A null preset consists of a blank title(all spaces, displayed as <blank title>) and no effects(displayed as <no effects>). Because of this, we recommend that you save one preset that is already blank to make it easy to delete stored presets. Presets 100 through 200 are null when you receive your unit or after a factory reset.

APPENDIX B

EXAMPLES

CREATING A PRESET

-Enter EDIT MODE.
-If you are not viewing preset 151, Use the PRESET SELECT buttons
 to scan up to preset 151.
-Press the RECALL/ENTER button [<blank title>, <no effects>].
-Press the ADD EFFECT button once, [ADD:HAR-EXCITER?].
*We are not going to choose this effect.
-Press the ADD EFFECT button again, [ADD:EQUALIZER?].
-Press RECALL/ENTER.
*You have just entered the equalizer into the chain, bottom
 display reads [EQu].
-Press ADD EFFECT three times, [ADD:DISTORTION?].
-Press RECALL/ENTER.
*Now a distortion algorithm is entered into the chain, [EQu+DST].
-Press ADD EFFECT twice, enter the COMPRESSOR into the chain.
*You pressed the ADD EFFECT button twice and then pressed the
 RECALL/ENTER button), display reads [EQu+CMP+DST].
-Press the ADD EFFECT button two more times, [ADD:EXPANDR-GAT?].
-Enter it into the chain (press RECALL/ENTER),[EQu+CMP+DST+EXP].
-Press ADD EFFECT three times [ADD:FLANGER?].
-Enter the Flanger into the effects chain [EQu+CMP+DST+/].
*Hey, what's that diagonal arrow? Why isn't [FLA] in the display?
-Press the VALUE UP button. [/+CMP+DST+EXP+/]
-Press the VALUE UP BUTTON again. [/+DST+EXP+FLA]
*Since the display cannot show all of the information, the
 diagonal arrows indicate more information to be viewed. Use the
 VALUE UP button to view right and the VALUE DOWN button to view
 left.
-Press the ADD EFFECT button three times and enter the MONO-DDL-S
 effect into the chain. [/DST+EXP+DDL+/]
-Press the ADD EFFECT button three more times and enter the
 REVERB-1 effect into the chain. [/+DST+EXP+DDL+/]
*We have just entered all the effects desired for this preset.

IF YOU WISH TO SAVE THIS CHAIN OF EFFECTS AS A PRESET YOU MUST
PRESS STORE NOW.

-Press STORE.
*The effects we have selected are now stored permanently in
 preset 151.

COPYING A PRESET

You may copy a preset from any location into another easily. (If you want to copy a factory preset into another factory preset location, you must first Unlock the destination preset.) To copy a factory preset into one of the 100 user presets follow the following steps.

-Enter EDIT Mode.
-Use the PRESET SELECT buttons to select the preset you want to copy.
-Press the RECALL button.
-Use the PRESET SELECT buttons to select the preset location you are copying to.
-Press the STORE button.

The preset has now been copied and stored to the new location.

RECALLING A FACTORY PRESET

-Make sure you are in the EDIT Mode. (Press EDIT button if not)
-Press the MIDI/UTILITY button.
-Press the SELECT> button ten times.
-Use the VALUE buttons to select the preset you want to recall.
-Press the RECALL button.
*Even though the title is not displayed in the LCD , the factory preset is now active, but , **IT IS NOT PERMANENT.** If you wish to make the preset permanent, you must **STORE** it. To store the preset in the first 100 locations, you must first unlock the existing preset. (See the paragraph on unlocking a preset) If you are copying to a location above 100, press the STORE button now.
-Press STORE.
*Notice that when you pressed the STORE button the Factory Preset's title appears in the display.

UNLOCKING A PRESET

-Make sure you are in the EDIT Mode. (Press EDIT button if not)
-Select and then RECALL the preset you wish to unlock.
-Press the MIDI/UTILITY button.
-Press the SELECT< button once. [PRESET 1..100/ = LOCKED _]
-Press the VALUE DOWN button once. [PRESET 1..100/ = UNLOCKED]
-Press the MIDI/UTILITY button again.
*The preset is now unlocked. If you wish to store new information in this location, press the STORE button now.

FACTORY RESET

There is a Factory Reset sequence which will reinitialize the SGE to ALL of its original values. Be sure that you have either downloaded or kept a written record of the Presets you want saved since they will be eliminated. To perform a Factory Reset you must press and hold the **PRESET DOWN, ADD EFFECT and MIDI/UTILITY** buttons simultaneously.

EXAMPLE 1:
Editing the MPT from the SGE front panel controls.

In this example, we will edit the MPT so that when MIDI numbers 1 and 2 are received, SGE PRESETS 60 and 151 will be recalled. It is assumed that the SGE's MPT has not been edited.

-Make sure you are in the EDIT Mode. (Press EDIT button if not)
-Press the MIDI/UTILITY button.
-Press the SELECT > button five times. You will see in the LCD [MIDI PROG= 0_] at the top and [PRESET= 1] on the bottom.
-Press the SELECT > again. The [_] now is to the right of [PRESET= 1].
-Hold in the VALUE UP button until the display reads [PRESET= 60_].
-Press the SELECT < button once.
-Press the VALUE UP button once.
-Press the SELECT > once.
-Use the VALUE buttons to select preset 151 (use rapid access mode)
-Exit MIDI mode by pressing the MIDI/UTILITY button once.

You may assign any preset # to any program # including a preset to a multiple of program #'s. To test the reassigned numbers, use a MIDI device to recall the presets. Your reassigned presets should be recalled.

EXAMPLE 2:
Editing the MPT with a keyboard or external controller.

Using this method of editing, you select the desired patch on the keyboard, and then select the desired PRESET on the SGE for that sound. You can do this while you are listening to the SGE.

When used with a keyboard or other device that will send MIDI PROGRAM CHANGE messages, MPT editing may be simplified. We will edit the MPT so that when MIDI numbers 3 and 4, are received, presets 96 and 1 will be recalled. It is assumed that the SGE has not had its MPT edited.

The keyboard MIDI OUT must be connected to the SGE's MIDI IN jack. The MIDI channel on the SGE must be set to the same channel that the keyboard will be sending messages on, or the SGE's OMNI mode must be ON.

-Make sure you are in EDIT Mode. (Press EDIT button if not)
-Press the MIDI/UTILITY button.
-Press the SELECT > button six times.
-Select a patch on the keyboard so that [MIDI PROG= 2] is displayed If the MPT has never been edited, [PRESET= 3] should be in the lower half of the display.
The patch that causes [MIDI PROG= 2] to appear in the display is usually the second or third patch of the lowest numbered bank if the keyboard has banks of patches.

-Use the VALUE UP and DOWN keys to select preset 96.
-With the keyboard change the MIDI PROGram number to 4.
-Set the PRESET to = 1.

You may continue to program each of the keyboard's patches (say there are 64) in this manner assigning any preset # to the patch. In the previous examples four of the MPT entries were edited. You may edit the entire MPT if desired.

INCREMENT PROGRAM

If you do not have access to a MIDI controller and you wish to change between PRESETs easily, you may want to edit the MPT for incrementing through a sequence of presets. Example 3 illustrates how this is done.

The sequence programmed in Example 3 may be accessed from the front panel. A more useful way of using a programmed sequence is to access the sequence using the REMOTE jack and a momentary footswitch. To access these presets we must program the REMOTE JACK to increment the programs. You can only increment up through the programs. Example 4 describes how program the REMOTE jack to sequence through the ten presets set up in Example 3 with a footswitch. Example five shows how to program the REMOTE jack for normal bypass operation.

EXAMPLE 3
Setting up a preset sequence including a bypass preset.

If you need to change between presets quickly without scanning or MIDI, this procedure will be to your advantage. As in the other examples, editing the MPT is the key. In this example we will edit the MPT to sequence through ten presets. Ten is not the limit. You may program a sequence of 127 presets if you wish. These presets will be in the order: 60, 151, 96, 1, 151, 35, 1, 69, 100 and 61. Notice that we repeated some presets and included preset 100 which is set up from the factory as a bypass preset (no effects stored in it). Remember that you can assign any preset to a MIDI number including using a preset at multiple locations. Using an empty preset as a bypass enables you to select no effect eliminating the need to bypass the unit from the front panel and then continuing on with an effect preset next in the chain. NOTE: If your mix control is fully to the right (all wet), no signal will pass through the SGE.

-Make sure you are in EDIT Mode. (Press EDIT button if not)
-Press the MIDI/UTILITY button.
-Press the SELECT> five times.
-Press the VALUE UP button until top of the display reads [MIDI PROG=   4_]. The sequence must start at program location # 0. Since we have programmed 0-3 already we will start at location # 4. (If you wanted different preset #'s in the first four locations reprogramming would be required.)
-Press the SELECT> button once.

-Use the VALUE UP button to select preset 151.
-Press the SELECT< button once.
-Change the MIDI PROG # to = 5
-Press the SELECT> again.
-Change the preset # to equal 35.
-Continue this way until all the presets are entered the last being 61 at [MIDI PROG=   9].
-Press the SELECT< button once.
-Press the VALUE DOWN button nine times (each time you press the button notice the [PRESET=] is reading the preset # you have programmed in.)

If you wish to access this sequence from the front panel, you must be in the MPT edit mode. With the cursor in the top half of the LCD ([MIDI PROG=   #_]), use the VALUE buttons to select the Preset number associated with the Program number.

EXAMPLE 4
Programming the REMOTE jack for Incrementing Programs

External Switch Mode [EXT SW MODE] allows you to program the REMOTE jack on the rear panel so that you may use a footswitch to increment through a desired set of presets or to operate as a normal bypass jack. Remember, you may only increment up when using a footswitch and the sequence cycles through to the beginning.

-Make sure you are in EDIT Mode. (press EDIT button if not)
-Press the MIDI/UTILITY button. The display will read [EXT SW MODE] in the top half and [= INCR PROGS   1 in the bottom half.
-Use the VALUE UP button to change the number to 9.

You have just programmed the SGE to sequence through the ten presets set in Example 3 when using a momentary footswitch plugged into the REMOTE jack.

EXAMPLE 5
Programming the REMOTE jack for the BYPASS function.

External Switch Mode [EXT SW MODE] allows you to program the REMOTE jack on the rear panel so that you may use a footswitch to increment through a desired set of presets or to operate as a normal bypass jack.

-Make sure you are in the EDIT Mode. (press EDIT button if not)
-Press the MIDI/UTILITY button. The display will read [EXT SW MODE] in the top half and [= INCR PROGS   1] in the bottom half.
-Use the VALUE DOWN button to change the display to read [= BYPASS ON/OFF] in the lower part of the display.

Now when the footswitch is used the BYPASS function is accessed. Remember, if the MIX control is set to all wet, no signal will be present at the output(s).

EXAMPLE 6
Setting the LCD view angle.

You may change the LCD view angle for the best visibility. The angle may be adjusted to maximize legibility of the characters from top, front or under viewing angles. When viewing from the top, use a higher number. If you are viewing the display directly from the front, use the middle numbers. Viewing the LCD when the SGE is above you, adjust the view angle with the lower numbers.

-Make sure you are in EDIT Mode. (Press EDIT button if not)
-Press the MIDI/UTILITY button.
-Press the SELECT < button three times.
-Use the VALUE UP or DOWN buttons to adjust the view angle

EXAMPLE 7
Setting up a preset with MIDI control.

In this example we will set up a preset using four effects and four MIDI controllers to control a parameter in each effect. First, we will select the four effects, next, we'll predecide which parameters are to be controlled and then, assign the **PM** information to the preset. The four effects are: EQ, FLANGER, MONO-DDL-S and REVERB-1. Since we know we are going to control four parameters we will also add four MIDI Control "effects" also. The HF-CUT in the EQ will be controlled by a MOD WHEEL. DELAY time in the DDL will be controlled by a PITCH WHEEL. FLANGER REGENERATION will be controlled by NOTE ON VELOCITY. POSITION in the REVERB will be controlled by NOTE ON VALUE.

Just to keep the example as simple as possible we will not modify any of the effects parameters when programming. The default settings for each parameter will provide an excellent starting point.

-Select Preset 153 (this should be a blank preset).
-Press the EDIT MODE button.
-Press ADD EFFECT once.
-Press the RECALL/ENTER button to add the EQ.
-Press ADD EFFECT once.
-Press ENTER to add the FLANGER to the preset.
-Press the ADD EFFECT button once.
-Press ENTER to add the MONO-DDL-S.
-Press ADD EFFECT once.
-Press ENTER to add REVERB-1 to the preset.
*We have added all our effects at this point.
-Press ADD EFFECT once.
-Press the ENTER button to add the first of four **PM** MIDI CONTROL
-Press ADD EFFECT once.
-Press the ENTER button to add the second **PM** MIDI CONTROL.
-Press ADD EFFECT once.
-Press the ENTER button to add the third **PM** MIDI CONTROL.
-Press the ADD EFFECT button for the last time.
-Press the ENTER button to add the last **PM** MIDI CONTROL.

*Notice the numeral 4 in the lower right of the LCD. This
 indicates there are four PM MIDI CONTROLS in the preset.
-Press the STORE button. This is not necessary to do now for
 programming, it is only a precaution.
*We are now going to assign the control values.
-Press the SELECT> button twelve [12] times.
-Don't change anything, this is what we want to be controlled.
-Press the SELECT> button once.
*Now we select the first MIDI CONTROLLER.
-Press and hold the VALUE DOWN until the bottom of the LCD reads
 [MC 1:MOD WHEEL].
-Press the SELECT> button once.
-Use the VALUE UP button to change the SCALE value to 17.
-Press the SELECT> button once.
-Use the VALUE DOWN button to change the value to 5.3K.
-Press the SELECT> button once.
-Press the VALUE UP button once.
-Press the SELECT> button once.
-Press the VALUE DOWN button once.
-Press the SELECT> button once.
-Use the VALUE UP button to change the value to 17.
-Press the SELECT> button twice.
-Press the VALUE UP button five times.
-Press the SELECT> button once.
-Press the VALUE DOWN button four times.
-Press the SELECT> button once.
-Use the VALUE UP button to set the SCALE value to 60.
-Press the SELECT> button twice.
-Press the VALUE UP button nine times.
-Press the SELECT> button once.
-Press the VALUE DOWN button five times.
-Press the SELECT> button once.
-Use the VALUE UP button to set the SCALE value to 33.
-Press the SELECT> button twice.
-Press the STORE button.

That's it! We've just programmed a preset for the effects and
controls we mentioned at the beginning of this example. What's
even better is this preset works. Hook it up to a keyboard and
try it. With the MOD WHEEL, kill the high frequencies when the
wheel is down. Increase the delay time by moving the PITCH WHEEL
up and decrease it when bringing it down. At its center position
the delay remains in the middle of the range. When you play the
keyboard softly, the flanger's regeneration is subtle. If you
play quicker, the regeneration increases. As you travel up the
keyboard notice that the position of the reverberated signal goes
further and further towards the rear. The lower registers are
more towards the front of the room. To reverse the
characteristics of the affected parameters, edit the preset just
created by changing all the SCALE values to the same number only
NEGATIVE. This provides the same control effects only INVERSE of
what was originally programmed.

EXAMPLE 8
Adding Performance MIDI to an existing preset.

In this example we are going to add PM to preset 34. The effect
parameters we will control are: HF-CUT in the LPF and DECAY in
the Reverb. The MOD WHEEL and NOTE ON VELOCITY   are the MIDI
controllers we will assign.

- Recall preset 40.
- Press the EDIT button.
- Press the ADD EFFECT button until [ADD:MIDI CONTRL?] is
  displayed in the lower half of the LCD.
- Press the RECALL/ENTER button.
- Press the ADD EFFECT button until [ADD:MIDI CONTRL?] is
  displayed again.
- Press the RECALL/ENTER button.
- Press the STORE button.
* We have just added two MIDI controllers to the preset.
- Press the SELECT< button eight times.
- Do not change anything, this is what you want to control.
- Press the SELECT> button once.
- Use the VALUE DOWN button (press and hold in) to display
  [MC 1:MOD WHEEL].
- Press the SELECT> button once.
- Use the VALUE DOWN button to change the SCALE value to 17.
- Press the SELECT> button once.
- Use the VALUE DOWN button to change the Center Value to 5.3K.
- Press the SELECT> button once.
- Press the VALUE UP button until [REV:DECAY = a #s] is
  displayed in the lower half of the LCD.
- Press the SELECT button once.
- Press the VALUE DOWN button four times ([NOTE ON VELOCITY]).
- Press the SELECT> button once.
- Use the VALUE DOWN button to set the SCALE value to 33.
- Press the SELECT> button twice.
* We will not change the decay time.
* To store this preset you must first UNLOCK it.
- Press the MIDI/UTILITY button.
- Press the SELECT< button once.
- Press the VALUE DOWN button once.
- Press the MIDI button again.
- Press the STORE button.

You now have edited a Factory Preset for PM control. You may edit
any existing preset to be controlled by PM.

APPENDIX C

SGE MIDI MESSAGES

The SGE responds to the following messages:

Program change:
      Cxh ddh
      x = channel number 0h to Fh for channels 1 to 16
      dd = program number 0h to 7Fh or 0 to 127

If the channel that the SGE is set to is not off and the channel matches (either it is the same number or OMNI is on), then the SGE will look up the preset in the MIDI Program Table (MPT) and recall the corresponding preset.

Channel Mode message for OMNI on/off
      Bxh 7Ch 0h : OMNI Mode Off
      Bxh 7Dh 0h : OMNI Mode On
      x = channel number, 0h to Fh for channels 1 to 16

If the channel matches the SGE's channel number, it will set the OMNI mode accordingly. The current OMNI mode does not affect this message, the channel must match regardless of current OMNI mode.

SYSTEM EXCLUSIVE MESSAGES

message format:
      general: <System Exclusive Status> <ART ID> <channel>
                  <product ID> <message ID> <message...> <EOX>

      in hex: F0h 1Ah 0xh 06h <message ID> <message...> F7h

            F0h — System Exclusive status byte.
            1Ah — ART manufacturer's ID number.
            0xh — channel number, 0 to 0Fh.
            08h — SGE product id code.
            F7h — End Of exclusive status byte.

Message ID values >= 40h are requests. A request is a message that when received by the SGE causes a message to be sent by the SGE.

0x is the channel number, 0 to 15 (00h to 0Fh). To the user, the channel number is displayed as 1 to 16.

Internally, presets are numbered 0 to 199. When a preset number is displayed, it is shown as 1 to 200. Any messages that refer to the SGE preset number refer to the internal number, 0..199. Preset numbers are referenced in message with 2 data bytes, least significant 7 bits, then most significant bit in the lsb of the next byte. Example: preset 1 on the LCD is referenced with 00h 00h, and preset 200 is referenced with 47h, 01h.

When channel   number is OFF and a front panel command for a dump
is processed,   the SGE sends a message coded for channel 1   (the
lowest channel number).

DETAILED DESCRIPTION OF MESSAGES

Set Bypass OFF   FØ 1A Øx Ø8 Ø3 ØØ ØØ F7
Set Bypass ON   FØ 1A Øx Ø8 Ø3 ØØ Ø1 F7
This allows remotely setting the state of BYPASS in the SGE
without affecting anything else in the unit.

request DUMP all presets   FØ 1A Øx Ø8 4B F7
    LOAD all presets   FØ 1A Øx Ø8 ØB <many bytes> F7
Dumps all presets in preset number order.   No compression of the
data is done.

request MPT table   FØ 1A Øx Ø8 4C F7
set MPT table   FØ 1A Øx Ø8 ØC <128 * 2 bytes> F7
For each MIDI program number there is a corresponding SGE preset
number. Each entry (internally) is Ø..199 and is sent as 2 bytes.
First the least significant 7 bits, then the msb.   This is done
for each of the 128 MIDI program numbers.

If you find you require additional MIDI technical information,
please contact or Customer Service department at (716) 436-2720.

APPENDIX D
MIDI Implementation Chart

ART SGE model 380   Date: June 1989
20 BIT MULTIPLE EFFECTS PROCESSOR.   Version: 1.00

Function		Transmitted	Recognized	Remarks
Basic	Default	X	1-16	note 1
Channel	Channel	X	1-16	
Mode	Default	X	Mode 1,3	note 1
	Messages	X	OMNI ON/OFF	
	Altered	X	O	
Note		X	O	
Number	True Voice	X	O	
Velocity	Note ON	X	O	
	Note OFF	X	O	
After	Key's	X	O	
Touch	Ch's	X	O	
Pitch Bender		X	O	
Control Change		X	O	
Prog		X	0-127	assignable to any
Change	True #	X		preset
System Exclusive		O	O	See manual
System	:Song Pos	X	X	
	:Song Sel	X	X	
Common	:tune	X	X	
System	:Clock	X	X	
Real Time	:Commands	X	X	
Aux	:Local ON/OFF	X	X	
Mes-	:All Notes Off	X	X	
sages	:Active Sense	X	X	
	:Reset	X	O	

Notes

1: Factory default is channel 1, OMNI ON. Current setting is
   maintained in non-volatile RAM and does not change when the
   SGE is powered on.

Mode 1: OMNI ON, POLY   Mode 2: OMNI ON, MONO   O: Yes
Mode 3: OMNI OFF, POLY   Mode 3: OMNI OFF, MONO   X: No

MAJOR SCALE HARMONY TABLE

	I	II	III	IV	V	VI	VII
FIRST ABOVE	+4	+3	+3	+4	+4	+3	+3
FIRST BELOW	-5	-5	-5	-5	-5	-5	-6
SECOND ABOVE	+7	+7	+7	+7	+7	+7	+6
SECOND BELOW	-8	-9	-9	-8	-8	-9	-9
OCTAVE ABOVE	+12	+12	+12	+12	+12	+12	+12
OCTAVE BELOW	-12	-12	-12	-12	-12	-12	-12

RELATIVE MINOR SCALE HARMONY TABLE

	I	II	III	IV	V	VI	VII
FIRST ABOVE	+3	+3	+4	+3	+3	+4	+4
FIRST BELOW	-9	-9	-8	-9	-9	-9	-8
SECOND ABOVE	+7	+6	+7	+7	+7	+7	+7
SECOND BELOW	-5	-6	-5	-5	-5	-5	-5
OCTAVE ABOVE	+12	+12	+12	+12	+12	+12	+12
OCTAVE BELOW	-12	-12	-12	-12	-12	-12	-12

Scaling Value Suggestions

PARAMETER	PBW	NONVEL	NONVAL	MW
EQ:HF-CUT	12	—	—	17
DDL:DELAY	25	30	45	22
DDL:DLY-L	15	30	74	19
DDL:DLY-R	15	30	74	19
DDL:REGEN	15	20	30	55
DDL:HFDAMP	55	53	100	55
DDL:LEVEL	55	75	—	63
CHO:WIDTH	64	35	32	7
CHO:SPEED	33	20	32	33
CHO:DELAY	15	6	6	20
REV:TYPE	—	—	—	—
REV:DECAY	30	15	25	15
REV:HFDAMP	20	—	—	25
REV:POSITN	15	—	—	15
REV:LEVEL	30	30	30	31
REV:DIFFUS	15	—	—	9
FLA:WIDTH	30	35	32	35
FLA:SPEED	30	20	32	35
FLA:REGEN	30	—	—	30
GAT:TYPE	—	—	—	—
GAT:DECAY	17	25	25	15
GAT:DIFFUS	9	—	—	15
GAT:LEVEL	33	40	69	25
PTR:TYPE	—	—	—	—
PTR:PITCH	25	—	50	30
PTR:FINE	33	—	27	12
PTR:REGEN	25	—	—	26
PTR:LEVEL	33	—	25	25
PAN:MOD	25	—	—	33
PAN:SPEED	25	—	—	33

PBW=PITCH BEND WHEEL
NONVEL=NOTE ON VELOCITY
NONVAL=NOTE ON VALUE (NOTE ON KEY #)
MW=MODULATION WHEEL
DE=DATA ENTRY

When a (-) is displayed, no value is suggested, but the parameter
is still controllable by a MIDI controller.

MIDI: CONTROLLERS & NUMBERS

CONTROLLER #	CONTROLLER DESCRIPTION
0	UNDEFINED
1	MOD WHEEL
2	BREATH CONTROLLER
3	UNDEFINED
4	FOOT CONTROLLER
5	PORTAMENTO TIME
6	DATA ENTRY (msb)
7	MAIN VOLUME
8	BALANCE
9	UNDEFINED
10	PAN
11	EXPRESSION CONTROLLER
12-15	UNDEFINED
16-19	GENERAL PURPOSE #'S 1-4
20-31	UNDEFINED
32-63	LSB FOR VALUES 0-31
64	DAMPER PEDAL (SUSTAIN)
65	PORTAMENTO
66	SOSTENUTO
67	SOFT PEDAL
68	UNDEFINED
69	HOLD 2
70-79	UNDEFINED
80-83	GENERAL PURPOSE #'S 5-8
84-90	UNDEFINED
91	EXTERNAL EFFECTS DEPTH
92	TREMELO DEPTH
93	CHORUS DEPTH
94	CELESTE (DETUNE) DEPTH
95	PHASER DEPTH
96	DATA INCREMENT
97	DATA DECREMENT
98	NON-REGISTERED PARAMETER # LSB
99	NON-REGISTERED PARAMETER # MSB
100	REGISTERED PARAMETER # LSB
101	REGISTERED PARAMETER # MSB
102-120	UNDEFINED
121-127	RESERVED FOR CHANNEL MODE MESSAGES

CONTINUOUS CONTROLLERS

PITCH BEND WHEEL
CHANNEL PRESSURE
POLY AFTER TOUCH
NOTE ON VELOCITY
NOTE ON KEY #
NOTE OFF VELOCITY
NOTE OFF KEY #

APPENDIX F
GLOSSARY OF TERMS

REVERBERATION--A complex sonic phenomenon characterized by multiple sound reflections from room surfaces, with a gradual decay in overall level and rolling off of higher frequency components.

EARLY REFLECTION--One cue comes from the time delay between the initial sound and the early well defined echoes of the first reflections off the floor, ceiling and walls. This time relates directly to the perceived size of the space.

PRE DELAY--In conventional recording practice, a delay is often used between the console and the reverb chamber. This pre delay adds an apparent depth to the reverb sound as well as separating the initial sound from the dense reverberation.

DECAY--Natural reverberation results when sound reflects off the boundaries of a confined space. The character of the reverberant sound depends on the size and shape of the space, the composition of the boundaries and the presence of objects in the space which reflect or absorb sound energy. Decay time is defined as the time required for the reverberant sound to decay to one millionth (-60 dB, RT-60)of its original energy.

H.F. Damping--As sound travels through air, or reflects off soft surfaces, the higher frequencies are absorbed quicker than the rest of the sound. This absorption of high frequency is termed damping.

POSITION--You may hear the reverberant sound from a number of different locations in a reverberant space. If you are near the front of the room, you will hear more of the initial sound. As you move towards the rear of the room you will hear more reverberant sound and less of the initial sound.

DIFFUSION--Varies the reverb sound from rough to smooth by increasing echo density and filling in the spaces between individual echoes. As diffusion is increased so is the smoothness of the sound.

---

1. ROCK CONCERT GTR

---

2. DYNA COMP WHA

---

3. CONCERT GTR WHA

---

4. MONSTER GTR

---

5. BRITISH STACK

---

6. BRITISH THUNDER

---

7. METAL CONCERT

---

8. TURBO FLANGE

---

9. SHIMMERING CHO

---

10. GLISTENNING CHO

---

11. MELLOW 12 STRING

---

12. BRITE 12 STRING

---

13. VARIPITCH CHORUS

---

14. ROTATING LESLIE

---

15. CONCERT LESLIE

---

16. TURBO LESLIE

---

17. GTR JAZZ HALL

---

18. GTR BLUES HALL

---

19. CONCERT RHYTHM

---

20. OVERDRIVE 12 STR

---

21. BASS SYNTHESIZER

---

22. CHICKEN PLUCK

---

23. SUPERDRIVE BASS

---

24. CONCERT LEAD GTR

---

25. ENGLISH TUBES

---

26. ELECTRO FUZZTONE

---

27. SHARP GLASS LEAD

---

28. HOT FULL STACK

---

29. BIG-N-BOLD

---

30. NIGHT DEMON GTR

---

31. ROCK SYNTH FIFTH

---

32. ARPEGGIATOR UP

----

33.   DOWNWARD SPIRAL

----

34.   REVERB #1 HALL

----

35.   REVERB #2 ROOM

----

36.   REVERB #3 VOCAL

----

37.   REVERB #4 PLATE

----

38.   EARLY REFLECTION

----

39.   CATHEDRAL REVERB

----

40.   STUDIO PLATE REV

----

41.   CHOIR LOFT REV

----

42.   CHURCH HALL REV

----

43.   INFINITE PLATE

----

44.   AMBIENT PERCUSS.

----

45.   DANCE DRUMS REV

----

46.   GATED VERB #1

----

47.   GATED VERB #2

----

48.   GATED REV+REVERB

----

49.   REVERSE REVERB

----

50.   STUDIO PLATE GAT

---

51. THUNDER SNARE

---

52. WAREHOUSE SNARE

---

53. BALLAD SNARE

---

54. VOICE ENHANCER

---

55. VOCAL CHORUS

---

56. VOCAL RVRS+SLAP

---

57. VOCAL BALLAD

---

58. CONCERT VOCALS

---

59. BOX OF BOOMS

---

60. EQUALIZER

---

61. COMPRESSOR

---

62. HARMONIC EXCITER

---

63. PITCH TRANS +5TH

---

64. WET SWEET CHORUS

---

65. STEREO DLY+CHOR

---

66. DREAM FLANGE

---

67.   STEREO DLY+FLANGE

---

68.   SWEET CLEAN JAZZ

---

69.   WARM SWEET JAZZ

---

70.   GATED FLANGE

---

71.   FLAN-FUNK RHYTHM

---

72.   DARK GTR FLANGE

---

73.   PANNING REVERB

---

74.   REV + M-TAP PAN

---

75.   SPACE DELAY

---

76.   JET LAG SLAP

---

77.   SWEPT SHIFT DLY

---

78.   BARBER POLE FLAN

---

79.   SPACE SHIFTER

---

80.   PING PONG DELAY

---

81.   MR. WALSH

---

82.   WARM TUBE BLUES

---

83.   OVERDRIVE TUBES

---

84. WARM OVERDRIVE

---

85. SMOOTH DRIVE

---

86. ROCK-N-ROLL OVRD

---

87. ROCK IN THE HALL

---

88. TURBO CHORUS

---

89. TUBE SHORT STACK

---

90. TUBE FULL STACK

---

91. GLASS SHATTER

---

92. HEAVY METAL SOLO

---

93. FAT AND WET

---

94. FAT AND DRY

---

95. PAN AM JAM

---

96. SUPER FEEDBACK

---

97. HOLLOW GTR LEAD

---

98. WAREHOUSE STACK

---

99. WALL-O-SOUND DST

---

100. <blank title>
     <no effects>   MIDI BYPASS

PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	PRESET #	Parameters	
											POSN.	Harmonic
											Range	Exciter
											POSN.	
											100Hz	EQ
											1KHz	
											10KHz	
											SLOPE	
											DRIVE	Compressor
											RELEASE	
											OUTPUT	
											TYPE	Distortion
											DRIVE	
											BITE	
											OUTPUT	
											TYPE	Expand/
											SOURCE	Gate/E.F.
											RANGE	
											OUTPUT/TUNING	
											HF−CUT	Low Pass
											TYPE	Flanger/
											WIDTH	Chorus/
											SPEED	Panner
											REGEN	
											DELAY	
											TYPE	
											# OF TAPS	
											Delay or DLY−L	
											DLY−R	DELAYS
											HF−DAMP	
											REGEN	
											LEVEL	
											TYPE	
											DECAY	
											POSITN	REVERBS
											HF−DAMP	
											DIFFUS.	
											LEVEL	
											TYPE	PITCH
											PITCH	
											FINE	TRANSPOSER
											BASE KEY	
											REGEN	
											LEVEL	
											DRY/MIX ASSIGN	

USER REGISTRATION CARD

MODEL #_____   SERIAL #_____
NAME_____
ADDRESS_____
CITY_____STATE_____   ZIP_____
PHONE (OPTIONAL)_____
DEALER_____
CITY_____STATE_____
PURCHASE DATE_____
INTENDED USE: __STUDIO   __HOME STUDIO   __PA
INSTRUMENT:__GUITAR __KEYBOARD   __OTHER_____
__COMMERCIAL/FIXED INSTALLATION   __BROADCAST
__OTHER_____
WHAT OTHER PIECE OF AUDIO EQUIPMENT DO YOU PLAN ON
PURCHASING IN THE NEXT 12 MONTHS_____
WHAT NEW PRODUCTS WOULD YOU LIKE TO SEE FROM ART__

COMMENTS ON THIS PURCHASE_____

WHAT MAGAZINES DO YOU SUBSCRIBE TO OR READ_____
_____
_____
_____

380 - 5004 - 100

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